

Sampling and Analysis Plan for  
Surface Water Water Quality  
Fiscal Year 2021  
(July 1, 2020 to June 30, 2021)



Revised: 6/26/2020

Distribution List (Emailed on 6/26/2020)

1. Erin Jordan, ADEQ Surface Water Quality Improvement Value Stream Manager, [ [HYPERLINK "mailto:Jordan.erin@azdeq.gov"](mailto:Jordan.erin@azdeq.gov) ]
2. Rik Gay, ADEQ Monitoring & Assessment Unit Manager, [ [HYPERLINK "mailto:rg11@azdeq.gov"](mailto:rg11@azdeq.gov) ]
3. Natalie Muilenberg, ADEQ Watershed Protection Unit Manager, [nm3@azdeq.gov](mailto:nm3@azdeq.gov)
4. Jason Jones, ADEQ Senior Scientist [ [HYPERLINK "mailto:jdj@azdeq.gov"](mailto:jdj@azdeq.gov) ]
5. Jason Sutter, ADEQ, Senior Hydrogeologist, [ [HYPERLINK "mailto:js9@azdeg.gov"](mailto:js9@azdeg.gov) ]
6. Sharma Torrens, AZDA PIO, Directors Office, [ [HYPERLINK "mailto:storrens@azda.gov"](mailto:storrens@azda.gov) ]
7. Jack Peterson, AZDA [ [HYPERLINK "mailto:jpeterson@azda.gov"](mailto:jpeterson@azda.gov) ]
8. John Rihs, USFS, Apache Sitegraves NF, [ [HYPERLINK "mailto:jrihs@fs.fed.us"](mailto:jrihs@fs.fed.us) ]
9. Chad Yocum, USFS, Prescott NF, [ [HYPERLINK "mailto:cmeyocum@fs.fed.us"](mailto:cmeyocum@fs.fed.us) ]
10. Kelly Mott Lacroix, USFS, Tonto NF, [ [HYPERLINK "mailto:kmottlacroix@fs.fed.us"](mailto:kmottlacroix@fs.fed.us) ]
11. Tom Runyon, USFS, Coconino NF, [ [HYPERLINK "mailto:thomas.runyon@usda.gov"](mailto:thomas.runyon@usda.gov) ]
12. Greg Olsen, USFS, Coronado NF, [ [HYPERLINK "mailto:gregory.olsen@usda.gov"](mailto:gregory.olsen@usda.gov) ]
13. Dave Weedman, AZG&F, [ [HYPERLINK "mailto:dweedman@azgfd.gov"](mailto:dweedman@azgfd.gov) ]
14. Marc Dahlberg, AZG&F, [ [HYPERLINK "mailto:mdahlberg@azgfd.gov"](mailto:mdahlberg@azgfd.gov) ]
15. Matt Bolt, USEPA, Region IX, [ [HYPERLINK "mailto:Bolt.Matthew@epa.gov"](mailto:Bolt.Matthew@epa.gov) ]

## 1.0 INTRODUCTION

This Sampling and Analysis Plan is considered a living document and will be updated periodically throughout the current fiscal year to reflect changes in the field.

### 1.1 Overview

This sample plan addresses water quality monitoring in streams and lakes throughout Arizona for the Surface Water Section Water Quality Planning and Improvement Value Stream hereafter referred to as the "Improvement VS".

Note: Sample plans for source identification are project specific and can range for several years. Objectives and details are included in each project SAP.

### 1.2 Project Staff

Improvement VS and Related Staff:

Natalie Muilenberg, ADEQ Watershed Protection Unit Manager, [nm3@azdeq.gov](mailto:nm3@azdeq.gov)  
Rik Gay, Monitoring and Assessment Unit Supervisor ([HYPERLINK "mailto:jd11@azdeq.gov"](mailto:jd11@azdeq.gov))

Jason D. Jones ([HYPERLINK "mailto:jdj@azdeq.gov"](mailto:jdj@azdeq.gov))  
Jason Sutter ([HYPERLINK "mailto:js9@azdeq.gov"](mailto:js9@azdeq.gov))  
Patti Spindler ([HYPERLINK "mailto:phs@azdeq.gov"](mailto:phs@azdeq.gov))  
Sam Rector ([HYPERLINK "mailto:smr@azdeq.gov"](mailto:smr@azdeq.gov))  
Trey Dempsey ([HYPERLINK "mailto:jd16@azdeq.gov"](mailto:jd16@azdeq.gov))  
Catherine Gullo ([HYPERLINK "mailto:cg8@azdeq.gov"](mailto:cg8@azdeq.gov))  
Afag Abbasova ([HYPERLINK "mailto:aa8@azdeq.gov"](mailto:aa8@azdeq.gov))  
Jason Sutter ([HYPERLINK "mailto:js9@azdeq.gov"](mailto:js9@azdeq.gov))  
Meghan Smart ([HYPERLINK "mailto:mks@azdeq.gov"](mailto:mks@azdeq.gov))  
Jessica Latzko ([HYPERLINK "mailto:jl15@azdeq.gov"](mailto:jl15@azdeq.gov))  
Ronald Tiller ([HYPERLINK "mailto:rlt@azdeq.gov"](mailto:rlt@azdeq.gov))  
Hans Huth ([HYPERLINK "mailto:hjh@azdeq.gov"](mailto:hjh@azdeq.gov))  
Ivan Lopez-Castrillo ([HYPERLINK "mailto:il2@azdeq.gov"](mailto:il2@azdeq.gov))

## 2.0 OBJECTIVES

### 2.1 Improvement VS Program Objectives:

The objectives of ADEQ Surface Water Improvement Value Stream are:

- Restore and maintain the chemical, physical and biological integrity of Arizona's lakes and streams
- Conduct ongoing monitoring of the waters of the state as required by A.R.S. §49-225;
- Provide credible data for surface water quality assessments required by §305(b) of the Clean Water Act;
- Provide credible data to identify impaired surface waters pursuant to §303(d) of the Clean Water Act;
- Determine compliance with applicable water quality standards;
- Collect stream macroinvertebrate data on reference sites to adjust the indexes of biological integrity.
- Provide credible data to characterize baseline water quality in Outstanding Arizona Waters and to determine whether water quality is being maintained, protected, or degraded.
- Issue Fish Consumption Advisories based on fish tissue data.

## 3.0 MONITORING DESIGN

Waterbodies typically meet more than one objective. For example, a waterbody may be selected because additional data is needed for the 305(b) assessment, it is an Outstanding Arizona Water and it is a reference site/waterbody.

### 3.1 Streams & Lakes

Targeted sites are selected to address data gaps for reaches identified in the 305(b) assessment, to monitor Outstanding Waters, to monitor reference sites for the biocriteria program, to monitor effluent dominated waters and to monitor special studies such as impacts from wildfires.

#### 3.1.1 Monitoring to Confirm Impairments or Delist

## FY21 Sampling and Analysis Plan for Water Quality

Sampling of impaired waters is performed to either confirm impairments or delist a waterbody. This is typically done when the data causing the original listing is old, or right at the threshold for impairment. Sampling is completed in accordance with the 'Sampling Impaired Water's Worksheet'.

### 3.1.2 Monitoring to Fill Data Gaps for the Clean Water Act Assessment

§305(b) of the Clean Water Act requires ADEQ to conduct a water quality assessment of Arizona's surface waters every two years. Current EPA guidance states that each surface water assessed should be placed in one of five assessment categories. The five categories are as follows:

- 1) Surface waters where all designated uses are being attained;
- 2) Surface waters that are attaining some designated uses but there is insufficient data to assess the remaining uses;
- 3) Surface waters with insufficient data to assess any designated use;
- 4) Surface waters that are not attaining one or more designated uses, but a Total Maximum Daily Load (TMDL) analysis is not required; and
- 5) Surface waters that are impaired for one or more designated uses and a TMDL is required.

Surface waters with insufficient data to determine whether a surface water is attaining designated uses or is impaired are identified in categories 2 and 3 on the assessment list. Surface waters in categories 2 and 3 are included on a planning list and targeted for water quality monitoring to fill existing data gaps. In some cases, data sets for some sample sites are incomplete and do not include all core parameters required for §305(b) water quality assessment. In other cases, there were an insufficient number of sampling events to make an assessment.

### 3.1.3 San Pedro Wildlife Area – National Resource Damage Assessment (NRDA)

ADEQ is committed to collecting water quality samples at one site in the Lower San Pedro Wildlife Area, a restoration site being managed by the AGFD and Trustees, of which ADEQ is a member agency. The NRDA Restoration plan calls for various types of monitoring, in which ADEQ collected spring macroinvertebrate, water samples and habitat measurements from 2012-2016 at two sites, and will continue to collect these spring only SEM samples and measurements at one site every five years beginning in 2021 through 2041 (2021, 2026, 2031, 2036, 2041). ADEQ was responsible for a Data Compilation report on the 2012-16 dataset which was delivered to Trustee agency representatives in 2018. ADEQ is also responsible for an additional data report in 2041 or as requested by the Trustees, in the interim. ADEQ is also to attend Trustees committee meetings, Lower San Pedro Workgroup meetings, participation in public meetings held by the Trustees, outreach events and development of publicity materials for meetings, as needed. Funding has been provided for these activities through the Trustees and NRDA fund (see Linda Taunt or Tinsae Babo).

### 3.1.4 Stream Objectives on Hold

#### 3.1.4.1 Outstanding Arizona Waters Monitoring

MU staff collect surface water quality data to characterize existing water quality and to determine whether water quality is being maintained and protected in Arizona's outstanding waters. Currently, there are 22 Outstanding Arizona Waters listed in Arizona's Administrative Code R18-11-112. The primary purpose of monitoring outstanding waters is to collect surface water quality data to characterize baseline water quality. A long-term goal of this program is to acquire enough water quality data over time to determine water quality trends in Arizona's outstanding waters and to determine whether state antidegradation requirements are being met (i.e., is water quality improving, being maintained, or is it degrading).

#### 3.1.4.2 Biocriteria Reference Program Monitoring

The MU's goal is to conduct bioassessments at a minimum of 10 biocriteria reference sites in each fiscal year. MU staff collect benthic macroinvertebrate samples in wadeable, perennial streams with suitable riffle habitats during the spring index period (April, May, or June).

## 3.2 Fish Tissue Monitoring

The Improvement VS monitors fish tissue to determine if the fish in Arizona's lakes and streams contain pollutants. ADEQ issues fish consumption advisories for waterbodies, pollutants and fish species that are above water quality standards. Sites are currently selected using a random sampling design. Targeted sites are selected based on the following:

- 1) Waterbodies that are heavily fished.
- 2) Data gaps. Additional data needed to determine if a fish advisory is needed. Additional sampling may be required if not all possible catchable fish have been sampled in a particular waterbody.
- 3) Collecting data to rescind a fish advisory or to determine progress toward removing an advisory is being achieved.

**4.0 METHODS & DATA QUALITY****4.1 Surface Water****4.1.1 Methods**

ADEQ's [ [HYPERLINK "http://static.azdeq.gov/wqd/sampling.pdf"](http://static.azdeq.gov/wqd/sampling.pdf) ] (Jones 2018) shall be followed for all sampling activities. Deviations from standard operating procedures will be noted on the field forms and in the Water Quality Database.

**4.1.2 Data Quality**

Data collected by ADEQ shall be of the highest quality possible. The following rules and documents outline ADEQ's approach to obtaining the highest quality data possible. Staff shall follow all of these documents to ensure the highest data quality.

- The 'Credible Data Rule' (A.A.C) R18-11-602
- Standard Operating Procedures for Surface Water Sampling (Jones 2018). Sections 3.2.5 and 3.2.7.7.
- [ [HYPERLINK "https://azdeq.gov/enviro/water/assessment/download/SWS\\_QAPP.pdf"](https://azdeq.gov/enviro/water/assessment/download/SWS_QAPP.pdf) ] (Jones 2015)

**5.0 LABORATORIES****5.1 Certification**

ADEQ certifies that the labs listed in Section 5.2 has/have the appropriate certification/accreditation, if necessary, to perform the analyses requested by ADEQ, as required by EPA's Laboratory Competency Policy."

The laboratories limits have been reviewed by ADEQ and shall meet the Measurement Quality Objectives in Section 2.3 of the Surface Water Section Quality Assurance Plan.

**5.2 Contract Labs**

#	Name	Lab Type	Address / Phone	Billing Code
1	Ecoanalysts, Inc	Macroinvertebrate & Algae Identification	1420 S. Blaine Suite 14 Moscow, ID 83843 (208) 882-2588 Tel	PO0000092419
2	EPA Region IX	Fish Tissue	1337 S 46th St, Richmond, CA (510) 412-2331	NA (Free)
3	Rhithron	Periphyton Identification	33 Fort Missoula Rd. Missoula, Montana 59804 Phone: 406-721-1977	PO0000092416
4	Eurofins Test America	Chemistry	4625 E Cotton Center Blvd #189 Phoenix, AZ (602) 437-3340	PO0000095490
5	Walker Ecological Services	Algal Toxins	5800 N. Kolb Rd #9150 Tucson, AZ 85750	ADEQ19-210886
6	Xenco	SSC	2525 W Huntington Dr. Tempe AZ 85282	PO0000092435

**Commented [JDJ1]:** Update once finance provides new codes.

**6.0 LABORATORY BUDGET**

Table 7. FY21 Lab Budget

Type	Analyses	Lab	Total Cost
Streams and Lakes	Chemistry	Test America	\$9,238.00
Streams and Lakes	Chem QC	Test America	\$1,000.00
Streams	Bugs	Ecoanalysts	\$14,080.00
Streams	Bug QC	Ecoanalysts	\$2,200.00

**Commented [JDJ2]:** Doesn't yet account for san pedro site or UST. 9238 assumes doing all sites. Cost to do the ones we have staff for currently is \$2500.

FY21 Sampling and Analysis Plan for Water Quality

Type	Analyses	Lab	Total Cost
Streams-BMP effectiveness-mine sites FY21	Chemistry (n=14)	Test America (\$410)	\$5740.00
Streams-BMP effectiveness-mine sites FY21	Chemistry QC (n=2)	Test America (\$410)	\$820.00
Streams-BMP effectiveness-mine sites FY20	Bugs (15)	Ecoanalysts (\$440)	\$6600.00
Streams-BMP effectiveness-mine sites FY20	Bug QC (1)	Ecoanalysts (\$440)	\$440.00
Fish	Hg, Se, Lipids	Test America	\$2,000.00
Fish	Fish QC	Test America	\$200.00
Lakes	Microcystin	Walker	\$2,000.00
Total			{=SUM(ABOVE) / "\$#,##0.00;(\$#,##0.00)"} }

**Commented [JDJ3]:** Assuming mercury done by EPA and Se cost \$20 per sample for 10 fish per 10 sites.

- 1- Multiplier added to estimate increased lab cost, since current lab costs were used to calculate lab budget.
- 2- Cost for macroinvertebrates and periphyton identification samples are for samples collected in previous FY. FY20 sample analysis cost added to FY21 SAP because processing bugs/algae takes 3 to 6 months to complete and invoice cannot be completed until following fiscal year.

## 7.0 HEALTH AND SAFETY PLAN

---

### 7.1 General health and safety considerations:

1. "Safety First!" is the guiding principle for MU personnel involved in field activities. Personal safety always has priority over samples and sample collection.
2. Follow general site safety procedures from the Standard Operating Procedures Manual.
3. Prepare a detailed trip routing form and submit to Unit Manager for each sampling trip. Follow your itinerary. Notify the Unit Manager of any changes to your scheduled itinerary.
4. Follow telephone check-in procedures at end of the sampling day from Standard Operating Procedures Manual.
5. First aid, CPR, and personal protection training (in house) is required for all MU personnel.
6. Perform regular maintenance and walk-around checks on field vehicles. Inspect your truck before you go out. Make sure you have a spare tire! Check bolts holding down the camper shell.
7. Emergency tool kit for each field vehicle.
8. First aid kit for each field vehicle.
9. Carry extra clothes during winter months in case you get wet.
10. A minimum of two persons will comprise field crews. Never sample alone.
11. No sampling after dark.
12. Someone on the trip should have a cell or satellite phone.
13. If you have open wounds, wear protective clothing against water contact.
14. If the river is in flood, do not sample or attempt wading.
15. Wait for thunderstorms to pass before sampling. Be ready to evacuate in the event of flash flood.
16. Carry a first-aid kit on the trip, and if hiking to sites, carry a smaller one in the backpack.
17. Do not trespass on private property without permission.
18. Do not force confrontations with strangers.
19. Take necessary precautions against the sun.
20. If attacked by bees, run in a zigzag pattern until clear of the swarm.
21. During winter, take necessary precautions against the cold.
22. Wear proper clothing for protection when sampling or traveling to/from site.
23. Be careful of slippery stream banks.
24. Avoid jumping from low terraces or banks into the stream bed. Ankle and foot injuries can occur from impacts with hidden boulders or cobbles.
25. Hand-held two-way radios should be used if visual contact between field members is lost.
26. Wait until you are on the main road or in town before using the sealer.
27. Make sure the inReach locator beacon is charged before a trip (if one is used)
28. Be prepared to spend the night in case you get stuck in a remote site. Some good things to have:
  - Warm clothes (Gloves, hats, socks, etc.)
  - Rain Poncho
  - Bug Spray
  - Flashlight
  - Sun Screen
  - Waterproof matches
  - Multi-purpose tool (Leatherman)
  - Extra food/water
  - First Aid Kit

### 7.2 Specific safety precautions:

1. For those with allergic reactions to bee stings, they are expected to provide and have readily available a bee testing kit and/or epipen with them while doing field work. They are also expected to make their field partner aware of their allergy and provide instruction for their care if stung by a bee or other insects that may cause an allergic reaction.
2. Be careful when using acid preservatives in the field. Open all acid vials carefully and take care to avoid getting acid on your hands or clothes. Avoid inhaling fumes from acid vials. Empty entire acid vial into sample bottles when and properly store used acid vials for later disposal at ADEQ when you return from your trip. Store acid vials securely in their Styrofoam containers in the back of the truck (not in the truck cab).
3. Field crews should be aware of the potential for illegal drug activity along the U.S.- Mexico border and contact Border Patrol when working in those areas (e.g., Lower Santa Cruz River and Nogales Wash).
4. Rubber gloves and irrigation boots or waders should be used in contaminated or effluent-dominated waters. Carry and use antibacterial soap or hand sanitizer.
5. Field crews should stay in voice contact of each other at all times.

## FY21 Sampling and Analysis Plan for Water Quality

6. Cell phones are recommended for field work for emergency use. Check out a satellite phone if you are going to a remote area where cell phone coverage is unlikely.
7. Stay hydrated! Don't forget to drink water, especially when working in the summer heat. Body hydration is the most important factor in avoiding hyperthermia. Hyperthermia is a condition of increased body temperature caused by exposure to excessive heat and it is a real concern for a good part of the year in Arizona. Don't discount the risk, it can happen to you! Contributing factors include physical exertion, lack of air movement, high temperatures, and lack of hydration. Early warning signs of hyperthermia are chilling, a throbbing pressure in the head, unsteadiness, dizziness, nausea, dry skin, rapid pulse, and muscle spasms. To avoid hypothermia, drink water in moderate amounts while you work...don't wait until you are thirsty. Don't substitute soda for water. Use good judgment when scheduling your daily fieldwork. Avoid working through the hottest part of the afternoon in the summer whenever possible.
8. Wear sun block. Take precautions against over-exposure to the sun. Wear a wide-brimmed hat & a long-sleeved shirt.
9. Wear your seat belt in the truck.
10. Do not wade in a stream when it is too deep or too fast. Observe the rule of 9. Do not attempt to wade in a stream when the velocity in ft/ second times depth is greater than 9. Always be aware of rapidly rising stages in the streams you are working in. With Arizona's flashy hydrology, be aware of dangerous flash flood conditions that can occur in a short period of time. Don't take chances!
11. Do not store food or drinks in sample coolers. Bring a dedicated cooler for food.

### 7.3 Emergency information:

Emergency Telephone Numbers: (use 911 where appropriate)  
 Fire: 911  
 Police: 911  
 Ambulance: 911

### 7.4 Safety Hazards

Table 8. Safety Hazards.

Activity	Identified Hazards	Safety Measures
a. Flow Gauging	Immersion/Drowning	Use the Rule of 9 (Velocity X depth) to determine whether stream is safe to enter.
	Falls/Slips	Wear waders, boots, or sandals with good traction characteristics. Where possible, use the gauging rod to assist as a "third leg."
	Infection from open cuts/sores/blisters	If afflicted, wear waders or boots only to protect sores from water contact.
b. Water Sample Collection	Immersion/Drowning Falls/Slips Infection from open cuts/sores/blisters	See safety measures for flow gauging above
c. Sample Processing	Acid Exposure/burns	Familiarize with MSDS for chemical contact/inhalation dangers. Wear nitrile gloves when processing samples. Wear eye protection to protect against splash hazard.
d. Bacteria Processing	Exposure to Pathogens	Wear gloves when processing bacteria samples. Do not pipette samples by mouth. Wash or disinfect hands thoroughly after processing/reading. Store incubated plates in a closed biohazard bag. Autoclave on return.
e. Bacteria Reading	Exposure to Pathogens	See safety precautions for bacteria processing above
f. Macroinvertebrate Collection	Immersion/Drowning Falls/Slips Infection from open cuts/sores/blisters	See safety measure for flow gauging. Rule of Nine should be modified to Rule of Six for macroinvertebrate collections.
	Insect bites	For certain aquatic insects, care should be taken to avoid insect bites. Use a spoon or other implement to collect/transfer insects to collection jar.
h. Macroinvertebrate Processing	Chemical Exposure	Familiarize with MSDS for chemical contact/inhalation dangers. Avoid inhalation of formalin vapors. Wear nitrile gloves when processing
i. SEM protocols	Immersion/Drowning Falls/Slips Infection from open cuts/sores/blisters	See safety measure for flow gauging.

FY21 Sampling and Analysis Plan for Water Quality

Activity	Identified Hazards	Safety Measures
	Animals/snakes/scorpions	When working along banks, be watchful for encounters for wild animals. Do not place hands and feet where they cannot be seen. Do not provoke a cornered animal. Do not handle wild animals.
j. Loading	Strains/Muscle pulls	For large coolers, packs, or other items, use two person teams. Lift with legs, not back.
k. Transport	Vehicular accidents	If driving, check the vehicle beforehand for jack, spare tire, emergency kit, adequate gas and oil, etc. Follow all pertinent traffic rules and regulations. Ensure that all items transported are properly secured. Wear safety belts.
l. Unloading	Strains/Muscle pulls	See safety precautions for loading (j).
m. Environmental Hazards	Sun exposure / heat exhaustion / heatstroke	Wear sunscreen. Wear hat and adequate protective clothing, particularly if sun-sensitive. Use the river to cool off.
	Hypothermia	For cold-weather runs, wear multiple layers of waterproof or water-resistant clothing. Avoid cotton. Follow trip lead recommendations.
	Bee stings	Personnel allergic to bee stings should carry an epinephrine kit at all times on the river.
	Snakebite	Do not place hands or feet where placement cannot be seen. Do not aggravate or handle snakes encountered. Keep distance. Ensure snakebite kit is present in event of bite.
	Rock fall	Be cognizant of rock fall hazards when sampling.
	Flash floods	Monitor weather during the trip, particularly thunderstorms building in the area. Be alert to conditions while sampling. Use extra caution in unforgiving areas where flooding could be catastrophic.
	Inclement Weather	Ensure proper clothing and gear is present to protect against sunburn, heat exhaustion, hypothermia, and other environmental responses. Do not sample or gauge in thunderstorms.
	Injury due to impact/concussion	Use care when hiking, stepping, or climbing to avoid falls or misplacement of limbs resulting in sprains, strains or muscle pulls. First aid kit should include materials for splinting/bandaging in the event of a broken limb.

## 7.5 Arizona Hospitals

Table 9. List of Arizona Hospitals (Updated AG4 6/2015)

City	Hospital Name	Phone #	Address
Benson	Benson Hospital	(520) 586-2261	450 S. Ocotillo Street
Bisbee	Copper Queen Community Hospital	(520) 432-5383	101 Cole Avenue
Casa Grande	Casa Grande Regional Medical Center	(520) 381-3600	1800 E. Florence Boulevard
Cottonwood	Verde Valley Medical Center	(928) 634-2251	269 S. Candy Lane
Douglas	Southeast Arizona Medical Center	(520) 364-7931	2174 W. Oak Avenue
Flagstaff	Flagstaff Medical Center	(928) 779-3366	1200 N. Beaver Street
Globe	Cobre Valley Community Hospital	(928) 425-3261	5880 S. Hospital Drive
Goodyear	West Valley Emergency Center	(623) 882-1500	13677 W McDowell Rd
Kingman	Kingman Regional Medical Center	(928) 757-2101	3269 Stockton Hill Road
Lake Havasu City	Havasut Regional Medical Center	(928) 855-8185	101 Civic Center Lane
Mesa	Banner Baywood Medical Center	(480) 321-2000	6644 E. Baywood Avenue (in east Mesa)
Nogales	Carondelet Holy Cross Hospital	(520) 285-3000	1171 W. Target Range Road
Parker	La Paz Regional Hospital	(928) 669-9201	1200 Mohave Road
Payson	Payson Regional Medical Center	(928) 474-3222	807 S. Ponderosa Street
Phoenix	John C. Lincoln Deer Valley Hospital	(623) 879-6100	19829 N. 27th Avenue (I-17 & 101)
Phoenix	Mayo Clinic Hospital	(480) 515-6296	5777 E. Mayo Boulevard (near the 101)
Prescott	Yavapai Regional Medical Center	(928) 445-2700	1003 Willow Creek Road
Safford	Mt. Graham Community Hospital	(928) 348-4000	1600 S. 20th Avenue



## FY21 Sampling and Analysis Plan for Water Quality

City	Hospital Name	Phone #	Address
Sedona	Verde Valley Medical Center	(928) 204-3000	3700 Hwy 89A
Show Low	Summit Healthcare Regional Medical Center	(928) 537-4375	2200 E. Show Low Lake Road
Sierra Vista	Canyon Vista Medical Center	(520) 263-2000	5700 E. Hwy 90
Sierra Vista	Raymond W. Bliss Army Health Center	(520) 533-9200	2240 Winrow Rd.
Springerville	White Mountain Regional Medical Center	(928) 333-4368	118 S. Mountain Avenue
Tucson	Northwest Medical Center	(520) 742-9000	6200 N. La Cholla Blvd
Tucson	Oro Valley Hospital	(520) 901-3500	1551 East Tangerine Road
Tucson	Tucson Medical Center	(520) 327-5461	5301 E. Grant Road (Craycroft & Grant)
Tucson	Carondelet St. Mary's Hospital	(520) 872-3000	1601 W. St. Mary's Ro
Tucson	Banner University Community Medical Center	(520) 694-8888	1501 N. Campbell Avenue
Wickenburg	Wickenburg Regional Hospital	(928) 684-5421	520 Rose Lane
Willcox	Northern Cochise Community Hospital	(520) 384-3541	901 W. Rex Allen Drive
Winslow	Winslow Memorial Hospital	(928) 289-4691	1501 Williamson Avenue
Yuma	Yuma Regional Medical Center	(928) 366-2000	2400 S. Avenue A

### 7.6 Trip Routing Form

The trip routing form is to be completed by project lead for every trip prior to departure.

### 7.7 Check-In Procedures

Check in with the Primary Contact listed on the routing form at the end of the day (time specified on routing form). The goal is to physically communicate with the check-in person that you are at the hotel or home and everything is fine. Leaving a message is acceptable but not preferred. Text messages are also acceptable but ideally the contact person will verify that they received the message. After working hours check-in calls should be placed to the contact person's home or cell phone. Let the contact person know of any deviations from the routing form.

### 7.8 Vehicle Problems

(Source [ [http://www.azdot.gov/Inside\\_adot/Equipment\\_Services/brochure.asp](http://www.azdot.gov/Inside_adot/Equipment_Services/brochure.asp) \ "Breakdown" ] )  
VEHICLE BREAKDOWNS - WHAT TO DO

We hope you will never experience a breakdown while on the road, but if one should occur, your first responsibility is for your own safety. Please get well off the road and be aware of any local hazards or traffic conditions that might pose a danger.

If your vehicle is still operable, drive it to the nearest safe haven or to a repair facility. If a "RED" warning light comes on, safely pull off the road, turn the engine off and call for help. If the "Check Engine" or "Service Engine Soon" light comes on; take the vehicle to the nearest ADOT Equipment Services Shop as soon as possible.

#### During Normal Working Hours

To request vehicle breakdown service Monday - Friday During Normal Work Hours (6:00 AM - 1:30 PM), please use the following procedures:

- Call the ADOT-ES vehicle repair shop closest to your location.
- Write down the vehicle data information on the back cover of your handbook. Please be sure to take this handbook with you if you have to leave the vehicle to call the ADOT-ES vehicle repair shop.
- You will need the following information when making the call to the appropriate shop:
  - Your Name, Agency and Agency telephone number
  - Your location; (nearest intersection or highway milepost marker and direction of travel)
  - Vehicle Number, VIN#, Make, Model, Year, and Color of vehicle
  - Telephone number where you can be contacted
  - Nature of the problem
- Call your Fleet Manager and/or Supervisor to advise them of your status.

NOTE: In most cases, the vehicle operator is responsible for changing a flat tire. Please review your fleet policy or contact your fleet manager regarding their policy on changing flat tires.

If you are instructed not to change the tire, you are physically unable to change the tire, or the location of the vehicle makes changing the tire unsafe, call the ADOT Equipment Services 24-hour vehicle breakdown hotline at 1.877.800.8520.

FY21 Sampling and Analysis Plan for Water Quality

**After Normal Working Hours, Weekends and Holidays**

To request vehicle breakdown service Monday - Friday After Normal Work Hours (1:30 PM - 6:00 AM), Weekends and Holidays, please use the following procedures:

- Call the ADOT Equipment Services 24-Hour vehicle breakdown Hotline at 1.877.800.8520. The call will be answered by ADOT's contract vendor for providing statewide vehicle breakdown service.
- Please provide the representative with the following information:
  - Your Name, Agency and Agency telephone number
  - Your location; (nearest intersection or highway milepost marker and direction of travel)
  - Vehicle Number, VIN#, Make, Model, Year, and Color of vehicle
  - Telephone number where you can be contacted
  - Nature of the problem
- The representative will arrange for a tow truck to be dispatched to your location. In most breakdown cases, the vehicle will be towed to the nearest ADOT-ES vehicle repair shop, maintenance yard or dealership for repairs.
- Contact your Fleet manager and/or supervisor to advise them of your status.
- The tow truck is authorized to bring fuel out to your location. If your vehicle's fuel gauge is low, notify the tow truck driver in advance to bring fuel.
- You may ride with the tow truck to the ADOT-ES vehicle repair shop, maintenance yard or dealership. However, you are responsible for arranging for your transportation from the repair shop, maintenance yard or dealership.

You (the vehicle operator) are not expected to pay for the towing service. Advise the tow truck driver that ADOT-ES will be paying for the towing service. The tow truck driver should give you a towing service "invoice/record". Please sign the invoice and leave it on the front seat of the vehicle.

NOTE: As previously noted, in most cases the vehicle operator is responsible for changing a flat tire. Please review your fleet policy or contact your fleet manager regarding their policy on changing flat tires.

If you are instructed not to change the tire, you are physically unable to change the tire, or the location of the vehicle makes changing the tire unsafe, call the vehicle breakdown Hotline at 1.877.800.8520.

During Weekends and Holidays . . . follow the procedures listed under After Normal Working Hours.

**Table 10. ADOT Equipment Service Shops**

(Source: [ HYPERLINK "[http://www.azdot.gov/Inside\\_adot/Equipment\\_Services/Shops2.asp](http://www.azdot.gov/Inside_adot/Equipment_Services/Shops2.asp)" ], Updated 7/31/13)

CITY/TOWN LOCATION	STREET HWY ROUTE	HOURS A.M. - P.M.	PHONE NO. CONTACT
AVONDALE	1702 E. Elesio Fleix Jr. Way	ALL YEAR 6:00 - 2:30	623.932.3204 Jeremy Cleavenger
CASA GRANDE	15614 W. Boxelder Dr.	ALL YEAR 6:00 - 4:30.	520.423.2378 Richard Dearie
DOUGLAS	21st & "B" Ave.	ALL YEAR 7:30 - 4:00	520.364.4742 Abe Varela
FLAGSTAFF	5701 RAILHEAD AVE.	ALL YEAR 7:00 - 3:30	928.526.0957 Kenny Macias
FREDONIA	US 89A, MP 610.9 (Page Satellite Shop)	ALL YEAR 6:00 - 2:30	928.643.7249 Wes McAllister
GAME AND FISH	5000 W. CAREFREE HWY	ALL YEAR 6:00 - 5:00	623.780.4160 Norman Rose
GLOBE	US 60, MP 253 (NORTHBOUND )	ALL YEAR 6:30 - 3:00	928.402.5640 Robert Gillespie
HOLBROOK	2407 E. NAVAJO BLVD	ALL YEAR 7:00 - 3:30	928.524.5466 Carl Sandefur
KAYENTA	Hwy 163, MP 394.5	Call Page Shop	928.645.2147 Hank Surzyn
KINGMAN	3540 E. HWY. 66	ALL YEAR 7:00 - 3:30	928.681.6211 Steve Carspecken
LITTLEFIELD	Old Hwy 91, MP 8	ALL YEAR	928.347.5936
MESA	2409 N. COUNTRY CLUB (Phoenix Satellite Shop)	ALL YEAR 5:00 - 3:30	480.644.7923 Lydia Zavala

FY21 Sampling and Analysis Plan for Water Quality

CITY/TOWN LOCATION	STREET HWY ROUTE	HOURS A.M. - P.M.	PHONE NO. CONTACT
PAGE	US 89, MP 551.2	ALL YEAR 6:00 - 2:30	928.645.2147 Hank Surzyn
PAYSON	200 N. COLCORD (Prescott Valley Satellite Shop)	ALL YEAR 7:00 - 3:30	928.468.5081 Bill Williams
PHOENIX	2225 S. 22ND. AVE (MAIN COMPLEX)  After Hours 877.800.8520	ALL YEAR 6:00 - 3:30	602.712.6634 602.712.6917 602.712.7044 Kevin Thomas  602.712.6634 - PM Appointments
PHOENIX CAPITOL MALL	1522 W. JACKSON ST. (Phoenix Satellite Shop)	ALL YEAR 6:00 - 4:30	602.542.3206 Matt Sharpe
PRESCOTT VALLEY	6901 E. 2nd St.	ALL YEAR 7:00 - 3:30	928.775.5079 x 3102 Chris Fuller
SAFFORD	1st Ave. and 32nd St.	ALL YEAR 7:30 - 4:00	928.428.2909 Dan Hays
SHOW LOW	200 W. MCNEIL	ALL YEAR 7:00 - 3:30	928.532.2381 Alex Romero
SPRINGERVILLE	US 60, MP 388.7 (Show Low Satellite Shop)	ALL YEAR 7:00 - 3:30	928.333.5460 Ken Witt
ST. JOHNS	US 180, MP 369 (Show Low Satellite Shop)	ALL YEAR 7:00 - 3:30	928.337.2332 Ken Witt
TUCSON	1444 W. GRANT RD. BLDG #9	ALL YEAR 6:00 am-10:30 pm	520.838.2860/2861 Scott Moody
YUMA	2243 GILA RIDGE RD.	ALL YEAR 7:00 - 3:30	928.317.2170 Charles McKinley

7.9 Staff Contacts

Table 11. Staff Contacts (Updated June 2020 by JDJ)

First	Last	Cell/Home	Work Ext.
JASON	JONES	(480) 298-3205	2235
JASON	SUTTER	(602) 361-3720	4468
MEGHAN	SMART	(480) 250-2616	4506
PATTI	SPINDLER	(602) 329-4610	4543
SAM	RECTOR	(480) 772-0264	4536
CATHERINE	GULLO	(774) 766-2190	5228
TREY	DEMPSEY	(858) 437-3569	8157
RIK	GAY	(720) 327-5813	8787
AFA	ABBASOVA	(602) 820-3487	2264
CODY	MAYNARD	(508) 446-6741	4367

8.0 REFERENCE MATERIAL

ADEQ, 2018, Jones, J., ed. Standard Operating Procedures for Surface Water Quality Sampling. Arizona Department of Environmental Quality TM06-02. Phoenix, AZ.

ADEQ, 2015. Jones, J. Surface Water Section Quality Assurance Program Plan. Phoenix, AZ

# Streams

## APPENDIX A. STREAM PARAMETERS & SITES

### A.1 Stream Target Analytes

All monitoring sites are sampled for a basic group of target analytes to assess whether surface water quality standards are being met. The basic group represents information that is typically gathered by most ambient water quality monitoring programs. The basic group includes general water chemistry, nutrients, total and dissolved metals, and bacteria (See TABLES A1, A2 & A3). Analytes in the basic group provides investigators with a basic understanding of the general chemistry of the surface water. Standardization of a basic suite of target analytes also provides consistency of information across surface waters. Additional parameters (e.g., total and free chlorine for effluent dependent water) may be added to the basic group if warranted by site-specific conditions.

A suite of field measurements are taken in addition to the basic chemical group at all sites. Field measurements such as dissolved oxygen, percent saturation dissolved oxygen, water temperature, and stream flow can only be measured in the field and are important for understanding the physical properties of the water body. Other measurements, such as pH, specific conductance, and turbidity are taken in the field because of their nature to be altered during sample transport to the laboratory. Macroinvertebrates are collected to assess the biological integrity of surface waters and to determine if aquatic life designated uses are supported.

**Table A1. Field Parameters with required minimum ranges, accuracy and resolution**

Parameter	Range	Accuracy	Resolution
Specific Conductivity	0-100 mS/cm / 5-100 mS/cm	± 0.5%	0.001 mS/cm
pH	0-14 Units	± 0.2 units / ±0.1 units	0.01 units
Water Temperature	-5 to 50 °C	± 0.10 °C	0.01 °C
Dissolved Oxygen (optical)	0-50 mg/L	± 0.1mg/L; ± 0.2 mg/L; ± 10% of reading	0.01 mg/L
Turbidity	0 – 1000 NTU	± 2% of reading from 0-500 NTU ± 3% of reading between 500-1000 NTU	0.01 NTU
Flow	-0.5 to +19.99 ft/sec	± 2% of reading + zero stability	NA

**Table A2. Sample Containers and Preservation**

Analysis Type	Bottle	Preservation
Inorganics	1 L Plastic	None, Wet Ice
Nutrients	1 L Plastic	H <sub>2</sub> SO <sub>4</sub> , Wet Ice
Dissolved Metals	500 mL Plastic	HN0 <sub>3</sub> , Wet Ice
Total Metals	500 mL Plastic	HN0 <sub>3</sub> , Wet Ice
Suspended Sediment Concentration (SSC)	1 L 'wide mouth' Nalgene	None
Chlorophyll a (water column)	2 L Amber Bottle, 30mL Amber bottle	Chilled and Dark
Chlorophyll a (benthic)	500 mL Composite Bottle, 30mL Amber bottle	Chilled and Dark
Periphyton ID	250 mL Composite Bottle	Chilled and Dark, 2+ mL Lugol's Solution
Macroinvertebrates	1 L Nalgene	Isopropyl Alcohol
E. Coli	100 mL Plastic	None

**Table A3. Parameter and Lab Information. See data gap list for which parameters to sample for.**

Chemical	Analysis Type	Method	Lab	MRL	MRL Unit	Parameter group	Holding Time
Chlorophyll a (benthic)	TOTAL	SM 10200H	Walker	0.10	UG/L	Chlorophyll a	NONE
Chlorophyll a (water column)	TOTAL	SM 10200H	Walker	0.10	UG/L	Chlorophyll a	NONE

## Streams

Chemical	Analysis Type	Method	Lab	MRL	MRL Unit	Parameter group	Holding Time
BERYLLIUM AND COMPOUNDS	DISSOLVED	EPA 200.8	TAX	0.001	mg/L	Dissolved Metals	6 MONTHS
CADMIUM	DISSOLVED	EPA 200.8	TAX	0.0001	mg/L	Dissolved Metals	6 MONTHS
COPPER	DISSOLVED	EPA 200.8	TAX	0.0005	mg/L	Dissolved Metals	6 MONTHS
LEAD AND COMPOUNDS (INORGANIC)	DISSOLVED	EPA 200.8	TAX	0.0005	mg/L	Dissolved Metals	6 MONTHS
NICKEL	DISSOLVED	EPA 200.8	TAX	0.0005	mg/L	Dissolved Metals	6 MONTHS
ZINC	DISSOLVED	EPA 200.8	TAX	0.0125	mg/L	Dissolved Metals	6 MONTHS
E. Coli	NA	Colilert	DEQ	1	CFU/100 mL	E. Coli	6 Hours
FLUORIDE	TOTAL	EPA 300.0	TAX	0.4	MG/L	Inorganics	28 DAYS
HARDNESS (CaCO <sub>3</sub> + MgCO <sub>3</sub> ) - DISSOLVED	CALCULATED	SM 2340B	TAX	13	MG/L	Inorganics	6 MONTHS
AMMONIA AS NITROGEN	TOTAL	SM 4500NH <sub>3</sub> D, BG	TAX	0.05	MG/L	Nutrients	28 DAYS
KJELDAHL NITROGEN	TOTAL	SM 4500-NH <sub>3</sub> D, E-97	TAX	0.5	MG/L	Nutrients	28 DAYS
NITRATE + NITRITE	TOTAL	SM4500 NO <sub>3</sub> E-00	TAX	0.1	MG/L	Nutrients	28 DAYS
PHOSPHORUS	TOTAL	SM 4500-PE	TAX	0.1	MG/L	Nutrients	28 DAYS
Periphyton Identification	NA	NRSA 2013 FOM	Rhithron	NA	NA	Periphyton ID	NONE
SUSPENDED SEDIMENT CONCENTRATION	SUSPENDED	ASTM D3977C	Xenco	1.0	MG/L	SSC	NONE
ARSENIC, INORGANIC	TOTAL	EPA 200.8	TAX	0.001	mg/L	Total Metals	6 MONTHS
BORON (BORON AND BORATES ONLY)	TOTAL	EPA 200.7	TAX	0.05	mg/L	Total Metals	6 MONTHS
CADMIUM	TOTAL	EPA 200.8	TAX	0.0001	mg/L	Total Metals	6 MONTHS
CHROMIUM	TOTAL	EPA 200.8	TAX	0.001	mg/L	Total Metals	6 MONTHS
COPPER	TOTAL	EPA 200.8	TAX	0.0005	mg/L	Total Metals	6 MONTHS
IRON	TOTAL	EPA 200.7	TAX	0.1	mg/L	Total Metals	6 MONTHS
LEAD AND COMPOUNDS (INORGANIC)	TOTAL	EPA 200.8	TAX	0.0005	mg/L	Total Metals	6 MONTHS
MANGANESE	TOTAL	EPA 200.8	TAX	0.0005	mg/L	Total Metals	6 MONTHS
MERCURY, ELEMENTAL	TOTAL	EPA 245.1	TAX	0.2	UG/L	Total Metals	28 DAYS
NICKEL	TOTAL	EPA 200.8	TAX	0.0005	mg/L	Total Metals	6 MONTHS
SELENIUM AND COMPOUNDS	TOTAL	EPA 200.8	TAX	0.0005	mg/L	Total Metals	6 MONTHS
THALLIUM	TOTAL	EPA 200.8	TAX	0.0001	mg/L	Total Metals	6 MONTHS
ZINC	TOTAL	EPA 200.8	TAX	0.0125	mg/L	Total Metals	6 MONTHS

Table A4. Site List and Schedule (see J:\WQD\Surface Water Section\SAMPLING\Datagaps\datagaps.gis.csv for the most current list of parameters and frequency).

WBID	WATERBODY_DESC	Staff	Type	Site	Latitude	Longitude	Parameters (Use Current List)	Freq	Priority
15050301-009	SANTA CRUZ RIVER	Trey/Cody	Potential Delist	SCSCR111.66	31.47	-110.9922222	Total COPPER , Total LEAD , Dissolved NICKEL	2	High
	SAN PEDRO RIVER	Trey	Special Study						Special

**Commented [JD14]:** Pick 3 sites to do dissolved aluminum / DOC to test new method. Account for dup/blank on each.

**Commented [JD15]:** Trey fill in information for san pedro trustee site.

# Streams

WBID	WATERBODY_DESC	Staff	Type	Site	Latitude	Longitude	Parameters <small>(Also Chartwell &amp; Inc)</small>	Freq	Priority
	Butte Creek Near Grove Ave Bridge	Trey/ Cody/ Erin Abel UST	Special Study	VRBTT000.08			DO, pH, conductivity, TDS) and analyses for total organic carbon (TOC), dissolved organic carbon (DOC), and the traditional EPA Method 8260/8270 for petroleum related VOCs/SVOCs	1	Special
	Butte Creek - Above Miller Creek	Trey/ Cody/ Erin Abel UST	Special Study	VRBTT000.06			DO, pH, conductivity, TDS) and analyses for total organic carbon (TOC), dissolved organic carbon (DOC), and the traditional EPA Method 8260/8270 for petroleum related VOCs/SVOCs	1	Special
	Butte Creek Above Lincoln Ave	Trey/ Cody/ Erin Abel UST	Special Study	VRBTT000.03			DO, pH, conductivity, TDS) and analyses for total organic carbon (TOC), dissolved organic carbon (DOC), and the traditional EPA Method 8260/8270 for petroleum related VOCs/SVOCs	1	Special
	Butte Creek NW Corner of Garden and Sheldon St	Trey/ Cody/ Erin Abel UST	Special Study	VRBTT000.16			DO, pH, conductivity, TDS) and analyses for total organic carbon (TOC), dissolved organic carbon (DOC), and the traditional EPA Method 8260/8270 for petroleum related VOCs/SVOCs	1	Special
	Miller Creek - Above Butte Creek and Granite Park	Trey/ Cody/ Erin Abel UST	Special Study	VRMIL000.32			DO, pH, conductivity, TDS) and analyses for total organic carbon (TOC), dissolved organic carbon (DOC), and the traditional EPA Method 8260/8270 for petroleum related VOCs/SVOCs	1	Special
	Miller Creek Downstream of Butte Creek at Granite Park	Trey/ Cody/ Erin Abel UST	Special Study	VRMIL000.22				1	Special

**Commented [JDJ6]:** The sampling lead will need to work with Erin Abel and figure out which VOCs to sample and then the lab to make sure we have the right bottles/preservatives/collection methods. Decision needs to be made on who pays for this sampling. Knowing the objectives would also help. This is a KOU1 from 1999 and that's most of what I know. Not sure if all this sampling 20 years later is relevant. Most stream intermittent/ephemeral so this is storm flow conditions.

Add site info once list finalized.

# Streams

WBID	WATERBODY_DESC	Staff	Type	Site	Latitude	Longitude	Parameters <small>(Along Characteristic Line)</small>	Freq	Priority
	Miller Creek above Madison Ave Pedestrian Bridge and CCJ	Trey/ Cody/ Erin Abel UST	Special Study	VRMIL000.40				1	Special
15060101-305	BONEYARD CREEK	Trey/Cody	Easy Datagap	SRBON001.69	33.8698147	-109.298885	Dissolved CADMIUM , Dissolved COPPER , Total ESCHERICHIA COLI , Dissolved ZINC , Total BORON , Total COPPER , Dissolved DISSOLVED OXYGEN (DO) , Total LEAD , Total MANGANESE , Total PH , Total PHOSPHORUS , Multi newhardness , Total newtn , Total MERCURY	2	High
15020001-013A	LITTLE COLORADO RIVER WEST FORK	Trey/Cody	Easy Datagap	LCWLR005.05	33.9586111	-109.5159167	Dissolved COPPER , Dissolved ZINC	2	High
15040004-028	CAMPBELL BLUE CREEK	Trey/Cody	Easy Datagap	UGCMB004.23	33.7388033	-109.0971569	Dissolved CADMIUM , Dissolved COPPER , Total ESCHERICHIA COLI , Dissolved ZINC , Total COPPER , Dissolved DISSOLVED OXYGEN (DO) , Total LEAD , Total PH , Multi newhardness , Total MERCURY	2	High
15060101-009	BLACK RIVER EAST FORK	Trey/Cody	Easy Datagap	SREFB008.27	33.822135	-109.2968867	Dissolved CADMIUM , Dissolved COPPER , Dissolved ZINC , Total ARSENIC , Total BORON , Total CHROMIUM , Total COPPER , Total FLUORIDE , Total LEAD , Total MANGANESE , Multi newhardness , Total MERCURY	2	High
15040004-025B	BLUE RIVER (BLR)	Trey/Cody	Potential Delist	UGBLR008.19	33.2921667	-109.1953056	Dissolved CADMIUM , Dissolved COPPER , Dissolved ZINC , Total BORON , Total COPPER , Dissolved DISSOLVED OXYGEN (DO) , Total LEAD , Total	2	High

# Streams

WBID	WATERBODY_DESC	Staff	Type	Site	Latitude	Longitude	Parameters <small>(Along Characteristic Line)</small>	Freq	Priority
							MANGANESE , Total PH , Multi newhardness , Total MERCURY , Total ESCHERICHIA COLI		
15060101-007	BLACK RIVER	Trey/Cody	Easy Datagap	SRBLR102.24	33.7040278	-109.4525833	Dissolved CADMIUM , Dissolved COPPER , Dissolved ZINC , Total ARSENIC , Total BORON , Total CHROMIUM , Total COPPER , Total FLUORIDE , Total LEAD , Total MANGANESE , Total PHOSPHORUS , Multi newhardness , Total newtn , Total INORGANIC NITROGEN (NITRATE AND NITRITE) , Total MERCURY	2	High
15050203-004B	ARAVAIPA CREEK	Trey/Cody	Easy Datagap	SPARA013.78	32.91102	-110.5503894	Dissolved CADMIUM , Dissolved COPPER , Total ESCHERICHIA COLI , Dissolved ZINC , Total COPPER , Total LEAD , Multi newhardness , Total MERCURY	2	High
15060105-013A	TONTO CREEK (TON)	Trey/Cody	Potential Delist	SRTON056.39	34.308	-111.0723611	Total ESCHERICHIA COLI	1	High
15060105-013B	TONTO CREEK (TON)	Trey/Cody	Potential Delist	SRTON053.87	34.2833333	-111.0708333	Total ESCHERICHIA COLI	1	High
15060103-801B	DEVILS CHASM CREEK	Trey/Cody	Easy Datagap	SRDEV000.38	33.822965	-110.86081	Dissolved CADMIUM , Dissolved COPPER , Dissolved ZINC , Multi newhardness	1	High
15060103-066	WEST FORK PINTO CREEK	Trey/Cody	Easy Datagap	SRWPN004.47	33.4396083	-111.0640075	Dissolved CADMIUM , Dissolved COPPER , Total ESCHERICHIA COLI , Dissolved ZINC , Dissolved DISSOLVED OXYGEN (DO) , Total PH , Multi newhardness , Total MERCURY	2	High
15060103-015B	CHERRY CREEK	Trey/Cody	Easy Datagap	SRCHE004.32	33.7212222	-110.8171111	Dissolved CADMIUM , Dissolved COPPER , Total NITROGEN , Dissolved ZINC , Total BORON , Total COPPER , Total LEAD , Total	2	High



# Streams

WBID	WATERBODY_DESC	Staff	Type	Site	Latitude	Longitude	Parameters (New Element & In)	Freq	Priority
							MANGANESE , Total PHOSPHORUS , Multi newhardness , Total newtn		
15060105-353	CHRISTOPHER CREEK	Trey/Cody	Potential Delist	SRCRS002.25	34.3073056	-111.0416944	Total ESCHERICHIA COLI , Total PH , Total SELENIUM, Dissolved DISSOLVED OXYGEN (DO)	4	High
15070102-024B	SYCAMORE CREEK (SYD)	Trey/Cody	Easy Datagap	MGSYD009.13	34.3473903	-111.9514033	Dissolved DISSOLVED OXYGEN (DO) , Total PH	2	High
15070102-023	AGUA FRIA RIVER	Trey/Cody	Easy Datagap	MGAFR087.06	34.3140572	-112.0614064	Total ARSENIC , Dissolved DISSOLVED OXYGEN (DO)	2	High
15070103-001B	HASSAYAMPA RIVER	Trey/Cody	Old Impairment	MGHSR002.67	33.3472222	-112.7258333	Total ESCHERICHIA COLI, Total SELENIUM	3	High
15040006-856	NORTH FORK CAVE CREEK	On hold	Easy Datagap	UGNCV000.16	31.88458	-109.20631	Dissolved COPPER	1	Low
15050201-002A	TURKEY CREEK	On hold	Easy Datagap	SPTUR028.53	31.8533369	-109.328285	Dissolved CADMIUM , Dissolved COPPER , Dissolved ZINC , Total BORON , Total COPPER , Total LEAD , Total MANGANESE , Multi newhardness , Total MERCURY	2	Low
15060101-010	RESERVATION CREEK	On hold	Easy Datagap	SRRES000.33	33.6991828	-109.4773972	Dissolved CADMIUM , Dissolved COPPER , Total ESCHERICHIA COLI , Dissolved ZINC , Total COPPER , Dissolved DISSOLVED OXYGEN (DO) , Total LEAD , Total PH , Multi newhardness , Total MERCURY	2	Low
15050100-014B	QUEEN CREEK	On hold	Old Impairment	MGQEN034.66	33.2776944	-111.1487778	Dissolved COPPER	3	Low
15050100-014C	QUEEN CREEK	On hold	Old Impairment	MGQEN030.06	33.2967942	-111.2108989	Dissolved COPPER	3	Low
15050100-1818	ARNETT CREEK	On hold	Old Impairment	MGARN090.11	33.2771097	-111.1703786	Dissolved COPPER	3	Low
15050100-014A	QUEEN CREEK	On hold	Old Impairment	MGQEN037.17	33.2838889	-111.1169444	Dissolved COPPER, Total LEAD, Total SELENIUM	10	Low
15060103-039B	COON CREEK (COO)	On hold	Easy Datagap	SRCOO001.92	33.6879722	-110.844	Dissolved CADMIUM , Dissolved COPPER , Dissolved ZINC , Total COPPER , Total	1	Low

## Streams

WBID	WATERBODY_DESC	Staff	Type	Site	Latitude	Longitude	Parameters (New Current List)	Freq	Priority
15060203-049B	PINE CREEK (PIE)	On hold	Easy Datagap	VRPIE008.19	34.3192222	-111.4575056	LEAD , Multi newhardness , Total MERCURY , Total ESCHERICHIA COLI , Dissolved COPPER , Total FLUORIDE , Multi newhardness	2	Low
15060203-459	ELLISON CREEK	On hold	Easy Datagap	VRELL006.30	34.3459444	-111.1920556	Dissolved CADMIUM , Dissolved COPPER , Total ESCHERICHIA COLI , Dissolved ZINC , Total COPPER , Dissolved DISSOLVED OXYGEN (DO) , Total LEAD , Total PH , Total PHOSPHORUS , Multi newhardness , Total MERCURY	2	Low
15020010-084	WOODS CANYON CREEK	On hold	New Datagap	LCWCY005.01	34.3321944	-110.9358056	Total COPPER , Total LEAD , Total PH , Dissolved CADMIUM , Dissolved COPPER , Dissolved DISSOLVED OXYGEN (DO) , Multi newhardness , Dissolved ZINC , Total ESCHERICHIA COLI , Total MERCURY	3	Low
15060203-024	POSSIL CREEK	On hold	Easy Datagap	VRFOS010.48	34.4033611	-111.6175	Total ESCHERICHIA COLI	1	Low
15060202-066B	BITTER CREEK	On hold	Easy Datagap	VRBIT003.93	34.7573589	-112.1059947	Dissolved CADMIUM , Dissolved COPPER , Total ESCHERICHIA COLI , Dissolved ZINC , Total COPPER , Dissolved DISSOLVED OXYGEN (DO) , Total LEAD , Total PH , Multi newhardness	2	Low
15060202-035	VERDE RIVER	On hold	Easy Datagap	VRVER154.07	34.8675	-112.1016667	Dissolved CADMIUM , Dissolved COPPER , Total ESCHERICHIA COLI , Dissolved ZINC , Total BORON , Total COPPER , Dissolved DISSOLVED OXYGEN (DO) , Total LEAD , Total MANGANESE , Total PH , Total PHOSPHORUS , Multi	2	Low

## Streams

WBID	WATERBODY_DESC	Staff	Type	Site	Latitude	Longitude	Parameters (New Current List)	Freq	Priority
15060202-052	VERDE RIVER	On hold	Easy Datagap	VRVER179.25	34.8944722	-112.3429444	newhardness , Total newtn , Total MERCURY Total ESCHERICHIA COLI	1	Low
15070103-004	HASSAYAMPA RIVER	On hold	Easy Datagap	MGHSR058.80	34.0451667	-112.7101111	Dissolved CADMIUM , Dissolved COPPER , Total ESCHERICHIA COLI , Dissolved ZINC , Total BORON , Total COPPER , Dissolved DISSOLVED OXYGEN (DO) , Total LEAD , Total MANGANESE , Total PH , Multi newhardness , Total MERCURY	2	Low
15020007-007	PUERCO RIVER	On hold	Old Impairment	LCPRR024.69	34.9791667	-109.795	Dissolved COPPER, Total ESCHERICHIA COLI	3	Low
15050301-500B	POTRERO CREEK	On hold	Potential Delist	SCPOT001.62	31.4299167	-110.9608333	Total PH , Total COPPER , Total LEAD , Dissolved DISSOLVED OXYGEN (DO) , Dissolved CHLORINE, Dissolved DISSOLVED OXYGEN (DO), Total ESCHERICHIA COLI	6	Medium
15050301-340	HUMBOLDT CANYON	On hold	Potential Delist	SCHMC000.05	31.4732222	-110.7343611	Total CADMIUM , Total THALLIUM , Total MERCURY , Total COPPER	9	Medium
15050301-560	COX GULCH	On hold	Old Impairment	SCCXG000.81	31.4652	-110.7822236	Dissolved BERYLLIUM, Dissolved CADMIUM, Dissolved COPPER, Total PH, Dissolved ZINC	10	Medium
15050301-011	NOGALES WASH	On hold	Old Impairment	SCNGW004.87	31.3416667	-110.9331389	Total AMMONIA-NITROGEN, Dissolved CHLORINE, Dissolved COPPER, Total ESCHERICHIA COLI	10	Medium
15050202-008	SAN PEDRO RIVER	On hold	Potential Delist	SPSPR127.50	31.6252778	-110.1741667	Dissolved COPPER	1	Medium
15050202-003	SAN PEDRO RIVER	On hold	Potential Delist	SPSPR101.25	31.9055556	-110.2461111	Dissolved COPPER , Dissolved CADMIUM , Dissolved ZINC , Total BORON , Total COPPER , Dissolved DISSOLVED OXYGEN (DO) , Total LEAD , Total MANGANESE , Total PH	8	Medium

# Streams

WBID	WATERBODY_DESC	Staff	Type	Site	Latitude	Longitude	Parameters (New Current List)	Freq	Priority
15020001-211	FISH CREEK	On hold	New Datagap	LCFIS003.86	34.0681944	-109.4952222	, Multi newhardness , Total MERCURY , Total ESCHERICHIA COLI Total COPPER , Total LEAD , Total PH , Dissolved CADMIUM , Dissolved COPPER , Dissolved DISSOLVED OXYGEN (DO) , Multi newhardness , Dissolved ZINC , Total ESCHERICHIA COLI , Total MERCURY	3	Medium
15040002-001	GILA RIVER	On hold	Old Impairment	UGGLR471.49	32.9650944	-109.3087667	Total ESCHERICHIA COLI	3	Medium
15040002-002	GILA RIVER	On hold	Old Impairment	UGGLR485.91	32.8808889	-109.2005833	Total ESCHERICHIA COLI	3	Medium
15040002-004	GILA RIVER	On hold	Old Impairment	UGGLR521.92	32.6480556	-108.8458333	Total ESCHERICHIA COLI Suspended SEDIMENT CONCENTRATION (SSC)	3	Medium
15040004-001	SAN FRANCISCO RIVER	On hold	Potential Delist	UGSFR006.48	33.0072222	-109.315	Dissolved CADMIUM , Dissolved COPPER , Dissolved ZINC , Total BORON , Total COPPER , Dissolved DISSOLVED OXYGEN (DO) , Total LEAD , Total MANGANESE , Total PH , Total THALLIUM , Multi newhardness , Total MERCURY , Total ESCHERICHIA COLI	9	Medium
15050100-012B	MINERAL CREEK (MIN)	On hold	Old Impairment	MGMIN008.81	33.2133333	-110.9994444	Dissolved COPPER , Dissolved DISSOLVED OXYGEN (DO) , Total SELENIUM	3	Medium
15050100-012D	MINERAL CREEK (MIN)	On hold	Old Impairment	MGMIN001.38	33.122	-110.9762222	Dissolved COPPER , Dissolved DISSOLVED OXYGEN (DO) , Total SELENIUM	3	Medium
15050203-022A	COPPER CREEK	On hold	Old Impairment	SPCOP008.37	32.7482306	-110.5042931	Total MERCURY , Dissolved CADMIUM , Dissolved IRON , Total SELENIUM , Dissolved ZINC , Dissolved CADMIUM , Dissolved COPPER , Dissolved	3	Medium

## Streams

WBID	WATERBODY_DESC	Staff	Type	Site	Latitude	Longitude	Parameters (New Current List)	Freq	Priority
15060202-059A	GRANITE CREEK	On hold	Old Impairment	VRGRA029.64	34.5517222	-112.4625	IRON, Total SELENIUM, Dissolved ZINC	3	Medium
15060202-013	NORTH FORK MILLER	On hold	Old Impairment	VRNMI000.28	34.5577056	-112.486625	Dissolved DISSOLVED OXYGEN (DO), Total ESCHERICHIA COLI	3	Medium
15060202-772	MANZANITA CREEK	On hold	Old Impairment	VRMAN000.01	34.5254111	-	Total ESCHERICHIA COLI	3	Medium
15070103-007A	HASSAYAMPA RIVER	On hold	Potential Delist	MGHSR113.09	34.4275	112.4791944	Total PH	5	Medium
15010010-006	VIRGIN RIVER	On hold	New Datagap	CGVGR051.33	36.9491667	-	Total BORON, Total MANGANESE, Total PH, Total COPPER, Total LEAD, Dissolved CADMIUM, Dissolved COPPER, Dissolved DISSOLVED OXYGEN (DO), Multi newhardness, Dissolved ZINC, Total ESCHERICHIA COLI, Total MERCURY	3	Medium
15010003-001	KANAB CREEK	On hold	Old Impairment	CGKAN000.26	36.3942883	-	Total SELENIUM	3	Medium
15010010-003	VIRGIN RIVER	On hold	Old Impairment	CGVGR038.80	36.8916667	112.6325511	Total ESCHERICHIA COLI	3	Medium
14070007-123	PARIA RIVER	On hold	Old Impairment	CGPAR001.23	36.8722222	113.9244444	Suspended SUSPENDED SEDIMENT CONCENTRATION (SSC)	3	Medium
15010010-004	VIRGIN RIVER	On hold	Potential Delist	CGVGR044.58	36.9213889	111.5947222	Total ESCHERICHIA COLI, Total SELENIUM, Suspended SUSPENDED SEDIMENT CONCENTRATION (SSC)	8	Medium
15020002-024	LITTLE COLORADO RIVER	On hold	New Datagap	LCLCR312.36	34.4147222	113.8605556	Total ESCHERICHIA COLI, Total BORON, Total COPPER, Total LEAD, Total MANGANESE, Total PH, Total MERCURY, Total SELENIUM	3	Medium
						109.4033333	Total BORON, Total MANGANESE, Total PH, Total COPPER, Total LEAD, Dissolved CADMIUM, Dissolved COPPER, Dissolved		

Streams

WBID	WATERBODY_DESC	Staff	Type	Site	Latitude	Longitude	Parameters (New Element Link)	Freq	Priority
							DISSOLVED OXYGEN (DO) , Multi newhardness , Dissolved ZINC , Total ARSENIC , Total CHROMIUM , Total FLUORIDE , Total INORGANIC NITROGEN (NITRATE AND NITRITE) , Total ESCHERICHIA COEI , Total MERCURY		
15020002-004	LITTLE COLORADO RIVER	On hold	Old Impairment	LCLCR226.31	34.7823889	-110.0438611	Total ESCHERICHIA COEL Suspended SUSPENDED SEDIMENT CONCENTRATION (SSC)	3	Medium

## APPENDIX B LAKE PARAMETERS &amp; SITES

## B.1 Lake Target Analytes

All monitoring sites are sampled for a basic group of target analytes to assess whether surface water quality standards are being met. The basic group represents information that is typically gathered by most ambient water quality monitoring programs. The basic group includes general water chemistry, nutrients, total and dissolved metals, and bacteria (See TABLES 1, 2 & 3). Analytes in the basic group provides investigators with a basic understanding of the general chemistry of the surface water. Standardization of a basic suite of target analytes also provides consistency of information across surface waters. Additional parameters (e.g., total and free chlorine for effluent dependent water) may be added to the basic group if warranted by site-specific conditions. A suite of field measurements are taken in addition to the basic chemical group at all sites. Field measurements such as dissolved oxygen, percent saturation dissolved oxygen, water temperature, and can only be measured in the field and are important for understanding the physical properties of the water body. Other measurements, such as pH, specific conductance, and turbidity are taken in the field because of their nature to be altered during sample transport to the laboratory.

Table B1. Field Parameters

Parameter	Equipment	Range	Accuracy	Response	Resolution
Depth	Xylem EXO2	Deep: 0-820 ft, 250 m Medium: 0-328 ft, 100 m Shallow: 0-33 ft, 10 m	+/-0.04% FS (+/-0.10m or +/-0.33 ft) +/-0.04 % FS(+/-10.04 m or +/-0.13 ft) +/-0.04 % FS(+/-10.04 m or +/-0.13 ft)	T63<30 sec T63<30 sec T63<30 sec	0.001 ft, 0.001 m
Specific Conductivity	Xylem EXO2	0-200 mS/cm	0-100: ± 0.5% of reading or 0.001; 100-200: ±1% of reading	T63<30 sec	0.0001 to 0.01 mS/cm
pH	Xylem EXO2	0-14 Units	± 0.1 units within +/-10°C of calibration temp; +/-0.2 pH units for entire temp range	T63<3 sec <sup>8</sup>	0.01 units
Air Temperature	SupCo ST09	-40 to 392 ° F	± 0.10 ° F		0.01 ° F
Water Temperature	Xylem EXO2	-5 to 35 ° C; 35 to 50 ° C	± 0.01 ° C <sup>2</sup> ; ±0.05C <sup>2</sup>	T63<1 sec	0.001 ° C
Dissolved Oxygen (optical)	Xylem EXO2	0-50 mg/L	± 0.1 mg/L for 20 mg/L or less;± 5% of reading for 20 to 50 mg/L	T63<5 sec T63<5 sec T63<5 sec	0.01 mg/L
Dissolved Oxygen % sat	Xylem EXO2	0-500% air saturation	0 to 200%: +/-1% of reading or 1% air saturation whichever is greater;200-500%:/-5% of reading	T63<5 sec	0.10%
TDS	Xylem EXO2	Calculated from SpC	Not specified		Variable
ORP	Xylem EXO2	-999 to +999 mV	+/-20 mV in Redox standard solution		0.1 mV
Secchi	Secchi Disk	0.1-100 m	+/-0.05 m		0.05 m

# Lakes

Parameter	Equipment	Range	Accuracy	Response	Resolution
Turbidity	Hach 2100P Turbidity Meter	0 – 1000 NTU	± 2% of reading from 0-500 NTU± 3% of reading between 500-1000 NTU		0.01 NTU
fDOM	Xylem EXO2	0 to 300 ppb quinine sulfate equiv (QSU)	Linearity: R2>0.999 for serial dilution o 300 ppb QS solution	T63<2 sec	0.01 ppb QSU
Chlorophyll	Xylem EXO2	0 to 400 ug/L Chl; 0 to 100 rhodamine fluouresent units (RFU)	Linearity: R2>0.999 for serial dilution of Rhodamine WT solution	T63<2 sec	0.01 ug/L Chl; 0.01 RFU
Blue-green algae, phycocyanin	Xylem EXO2	0 to 100 ug/L; 0-100 RFU	Linearity: R2>0.999 for serial dilution of Rhodamine WT solution from 0 to 100 ug/ml BGA-PC equiv	T63<2 sec	0.01 ug/L; 0.01 RFU

Table B2. Sample Containers and Preservation

Analysis Type	Bottle	Preservation
Inorganics	1 L Plastic	None, Wet Ice
Total Nutrients	500 mL Plastic	H <sub>2</sub> SO <sub>4</sub> , Wet Ice
Ortho-P	250 mL Plastic	Wet Ice
Dissolved Metals	500 mL Plastic	Filter, HN0 <sub>3</sub> , Wet Ice
Total Metals	500 mL Plastic	HN0 <sub>3</sub> , Wet Ice
Chlorophyll A	Dark Plastic 1L	Wet Ice
TOC/DOC	Amber Glass 250 or 500 mL	H <sub>2</sub> SO <sub>4</sub> , Wet Ice
Algae ID	250 mL Plastic	Lugols, Wet Ice
Zooplankton	250 mL Plastic	ETOH, Wet Ice
Microcystin	250 mL Plastic	Wet Ice or Cool Pack
E. Coli	100 mL Plastic	None

Table B3. Parmeter and Lab Information. See data gap list for which parameters to sample for.

Chemical	Analysis Type	Method	Lab	MRL	MRL Unit	Parameter group	Holding Time
E. Coli	NA	Colilert	DEQ	1	CFU/100 mL	E. Coli	6 Hours
AMMONIA AS NITROGEN	TOTAL	SM 4500NH3 D, BG	TAX	0.05	MG/L	Nutrients	28 DAYS
ARSENIC, INORGANIC	TOTAL	EPA 200.8	TAX	0.001	mg/L	Total Metals	6 MONTHS
BERYLLIUM AND COMPOUNDS	DISSOLVED	EPA 200.8	TAX	0.001	mg/L	Dissolved Metals	6 MONTHS
BORON (BORON AND BORATES ONLY)	TOTAL	EPA 200.7	TAX	0.05	mg/L	Total Metals	6 MONTHS
CADMIUM	DISSOLVED	EPA 200.8	TAX	0.0001	mg/L	Dissolved Metals	6 MONTHS
CADMIUM	TOTAL	EPA 200.8	TAX	0.0001	mg/L	Total Metals	6 MONTHS
CHROMIUM	TOTAL	EPA 200.8	TAX	0.001	mg/L	Total Metals	6 MONTHS
COPPER	DISSOLVED	EPA 200.8	TAX	0.0005	mg/L	Dissolved Metals	6 MONTHS
COPPER	TOTAL	EPA 200.8	TAX	0.0005	mg/L	Total Metals	6 MONTHS
FLUORIDE	TOTAL	EPA 300.0	TAX	0.4	MG/L	Inorganics	28 DAYS



## Lakes

Chemical	Analysis Type	Method	Lab	MRL	MRL Unit	Parameter group	Holding Time
HARDNESS (CaCO <sub>3</sub> + MgCO <sub>3</sub> ) - DISSOLVED	CALCULATED	SM 2340B	TAX	13	MG/L	Inorganics	6 MONTHS
IRON	TOTAL	EPA 200.7	TAX	0.1	mg/L	Total Metals	6 MONTHS
KJELDAHL NITROGEN	TOTAL	SM 4500-NH <sub>3</sub> D, E-97	TAX	0.5	MG/L	Nutrients	28 DAYS
LEAD AND COMPOUNDS (INORGANIC)	DISSOLVED	EPA 200.8	TAX	0.0005	mg/L	Dissolved Metals	6 MONTHS
LEAD AND COMPOUNDS (INORGANIC)	DISSOLVED	EPA 200.8	TAX	0.0005	mg/L	Dissolved Metals	6 MONTHS
LEAD AND COMPOUNDS (INORGANIC)	TOTAL	EPA 200.8	TAX	0.0005	mg/L	Total Metals	6 MONTHS
MANGANESE	TOTAL	EPA 200.8	TAX	0.0005	mg/L	Total Metals	6 MONTHS
MERCURY, ELEMENTAL	TOTAL	EPA 245.1	TAX	0.2	UG/L	Total Metals	28 DAYS
NICKEL	DISSOLVED	EPA 200.8	TAX	0.0005	mg/L	Dissolved Metals	6 MONTHS
NICKEL	TOTAL	EPA 200.8	TAX	0.0005	mg/L	Total Metals	6 MONTHS
NITRATE + NITRITE	TOTAL	SM4500 NO <sub>3</sub> E-00	TAX	0.1	MG/L	Nutrients	28 DAYS
PHOSPHORUS	TOTAL	SM 4500-PE	TAX	0.1	MG/L	Nutrients	28 DAYS
SELENIUM AND COMPOUNDS	TOTAL	EPA 200.8	TAX	0.0005	mg/L	Total Metals	6 MONTHS
THALLIUM	TOTAL	EPA 200.8	TAX	0.0001	mg/L	Total Metals	6 MONTHS
ZINC	DISSOLVED	EPA 200.8	TAX	0.0125	mg/L	Dissolved Metals	6 MONTHS
ZINC	TOTAL	EPA 200.8	TAX	0.0125	mg/L	Total Metals	6 MONTHS
Dissolved Organic Carbon	DISSOLVED	SM 5310 C	TAX	0.5	MG/L	TOC/DOC	28 DAYS (P)
Total Organic Carbon	TOTAL	SM 5310 C	TAX	0.5	MG/L	TOC/DOC	28 DAYS (P)
Chlorophyll/pheophytin/phyocyanin	TOTAL	EPA 445	Legend	0.1	UG/L	Chlorophyll	48 HOURS
Zooplankton ID	TOTAL	Microscopy	Walker	1	Unit/ML	Zooplankton	14 DAYS (P)
Microcystin	TOTAL	Polyclonal ELISA (ADDA-specific)	Walker	0.1	Ng/mL	Microcystin	NA
Algae ID	TOTAL	Sedgewick-Rafter Slide	Legend	1	Unit/ML	Algae ID	14 DAYS (P)
TOTAL SUSPENDED SOLIDS	DISSOLVED	SM 2540D	TAX	10	MG/L	Inorganics	7 DAYS

Table B4. Site List and Schedule (see J:\WQD\Surface Water Section\SAMPLING\Datagaps\datagapsgis.csv for the most current list of parameters and frequency).

WBID	WATERBODY_DESC	Staff	Type	Site	Latitude	Longitude	Parameters [Use Current List]	Freq	Priority
15060202-1660	WILLOW CREEK RESERVOIR	CG8	Potential Delist	VRWIC-A	34.6016472	- 112.4321111	Total BORON , Total COPPER , Total LEAD , Total MANGANESE , Total ESCHERICHIA COLI , Total MERCURY , Total AMMONIA-NITROGEN	3	High
15030101-0960	LAKE MOHAVE	CG8	Easy Datagap	CLMOH-A	35.1983333	- 114.5686111	Dissolved CADMIUM , Dissolved COPPER , Total ESCHERICHIA COLI , Total	2	High

# Lakes

WBID	WATERBODY_DESC	Staff	Type	Site	Latitude	Longitude	Parameters <small>[ Use Current ] [ Use ]</small>	Freq	Priority
							SELENIUM, Dissolved ZINC , Total ARSENIC , Total BORON , Total CHROMIUM , Total COPPER , Dissolved DISSOLVED OXYGEN (DO) , Total FLUORIDE , Total LEAD , Total MANGANESE , Total PH , Multi newhardness , Total INORGANIC NITROGEN (NITRATE AND NITRITE) , Total MERCURY		
15060101-0420	CRESCENT LAKE	CG8	Old Impairment	SRCRE-B	33.9097222	- 109.4205556	Total PH	10	High
15040004-0840	LUNA LAKE	CG8	Potential Delist	UGLUN-A	33.8288889	- 109.0831111	Total MERCURY , Dissolved DISSOLVED OXYGEN (DO)	7	High
15020015-0730	KINNIKINICK LAKE	On hold	Easy Datagap	LCKIN-A	34.8958333	- 111.2991667	Dissolved CADMIUM , Dissolved COPPER , Total ESCHERICHIA COLI , Dissolved ZINC , Total COPPER , Dissolved DISSOLVED OXYGEN (DO) , Total LEAD , Total PH , Multi newhardness , Total MERCURY	2	Low
15020015-0090	ASHURST LAKE	On hold	Easy Datagap	LCASH-B	35.0230556	- 111.4030556	Dissolved CADMIUM , Dissolved COPPER , Total ESCHERICHIA COLI , Dissolved ZINC , Total BORON , Total COPPER , Dissolved DISSOLVED OXYGEN (DO) , Total LEAD , Total MANGANESE , Total PH , Multi newhardness , Total MERCURY	2	Low
15060106B-0300	CHAPARRAL PARK LAKE	On hold	Potential Delist	MGCHA-A	33.5113889	- 111.9077778	Total BORON , Total MANGANESE , Total PH , Total MERCURY , Dissolved DISSOLVED OXYGEN (DO)	6	Low
15060106B-0410	CORTEZ PARK LAKE	On hold	Old Impairment	MGCOR-A	33.5705556	- 112.1191667	Dissolved DISSOLVED OXYGEN (DO), Total PH	10	Low
15060106B-0050	ALVORD PARK LAKE	On hold	Old Impairment	MGALV-A	33.375	- 112.1383333	Total AMMONIA-NITROGEN	10	Low

Lakes

WBID	WATERBODY_DESC	Staff	Type	Site	Latitude	Longitude	Parameters [Use Current, Use]	Freq	Priority
15060202-1590	WATSON LAKE	On hold	Potential Delist	VRWAT-A	34.5952778	- 112.4166389	Total MERCURY , Dissolved DISSOLVED OXYGEN (DO) , Total PH	5	Medium
15060202-1060	PECK'S LAKE	On hold	Old Impairment	VRPEC-A	34.7825	- 112.0394444	Dissolved DISSOLVED OXYGEN (DO), Total PH	10	Medium

## APPENDIX C - FISH PARAMETERS &amp; SITES

## C1. Sample Containers and Preservation

Analysis Type	Bottle	Preservation
Fish Tissue	Fish Bottle	Dry Ice/Frozen

Table C2. Test America - Holding Times, Reporting Limits and Analytical Methods for Fish

Chemical	Analysis Type	Method	MRL	MRL Unit	Bottle	Holding Time
MERCURY, ELEMENTAL	TOTAL	EPA 7473	0.05	UG/L	Fish Bottle	6 MONTHS
Selenium	Total	6020A	0.25	mg/Kg	Fish Bottle	6 Months

Table C4. Site List and Schedule. Target fish species for old impairments = species for original advisory.

WBID	WATERBODY_DESC	Staff	Type	Site	Latitude	Longitude	Parameters (Use Current List)	Freq	Priority
14070006-1130	LAKE POWELL	Utah DEQ	Old Impairment	CGPOW-BULLF	37.5158333	-110.7405556	Total MERCURY, Total Selenium	1	High
15030204-0040A	ALAMO LAKE	Trey	Old Impairment	BWALA-A	34.23275	-113.6004333	Total MERCURY, Total Selenium, Total AMMONIA-NITROGEN, Total PH	1	High
15010004-1340	SANTA FE RESERVOIR	Trey	Data Gap	CGSAT-A	35.24194	-112.1869	Total MERCURY, Total Selenium	1	High
15060103-1240	ROOSEVELT LAKE	Trey	Old Impairment	SRROO-A	33.6769444	-111.1541667	Total MERCURY, Total Selenium	1	High
15060105-004	TONTO CREEK (TON)	Trey	Old Impairment	SRTON011.00	33.7921306	-111.2565083	Total MERCURY, Total Selenium	1	High
15060105-006	TONTO CREEK (TON)	Trey	Old Impairment	TDB	34.1264	-111.2522333	Total MERCURY, Total Selenium	1	High
15060105-008	TONTO CREEK (TON)	Trey	Old Impairment	SRTON019.37	33.9811389	-111.3021944	Total MERCURY, Total Selenium	1	High
15060105-009	TONTO CREEK (TON)	Trey	Old Impairment	SRTON032.62	34.1264	-111.2522333	Total MERCURY, Total Selenium	1	High
15060105-011	TONTO CREEK (TON)	Trey	Old Impairment	SRTON046.90	34.2151775	-111.0997133	Total MERCURY, Total Selenium	1	High
15050304-0080	ARIVACA LAKE	On hold	Old Impairment	SCARI-A	31.5327778	-111.2547222	Total MERCURY, Total Selenium	1	Low
15020008-0820	LONG LAKE (LOWER)	On hold	Old Impairment	LCLLL-A	34.7805556	-111.2036111	Total MERCURY, Total Selenium	1	Low
15020008-1430	SOLDIER ANNEX LAKE	On hold	Old Impairment	LCSAL-A	34.7819444	-111.2288889	Total MERCURY, Total Selenium	1	Low
15020008-1440	SOLDIER LAKE	On hold	Old Impairment	LCSOL-A	34.7966667	-111.2333056	Total MERCURY, Total Selenium	1	Low

FY21 Sampling and Analysis Plan for Water Quality



WBID	WATERBODY_DESC	Staff	Type	Site	Latitude	Longitude	Parameters (See Current List)	Freq	Priority
15020015-0890	LAKE MARY (LOWER)	On hold	Old Impairment	LCMAL-A	35.1119444	-111.5825	Total MERCURY, Total Selenium	1	Medium
15020015-0900	LAKE MARY (UPPER)	On hold	Old Impairment	LCMAU-A	35.0802778	-111.5316667	Total MERCURY, Total Selenium	1	Medium
15050301-1070	PENA BLANCA LAKE	On hold	Old Impairment	SCPEN-A	31.4086111	-111.0952778	Total MERCURY, Total Selenium	1	Medium
15060106A-0070	APACHE LAKE	On hold	Old Impairment	SRAPA-A	31.5913889	-111.3425	Total MERCURY, Total Selenium, Dissolved DISSOLVED OXYGEN (DO)	1	Medium

## APPENDIX D – 106 MONITORING INITIATIVE PROJECTS

## D1. Sample Containers and Preservation

Analysis Type	Bottle	Preservation
Macroinvertebrates	1-L Nalgene Bottle	99% Isopropanol

Table D2. Bioassessment Site List and Schedule – BMP Effectiveness sites under mining remediation

WBID	WATERBODY_DESC	Group	Type	Site	Latitude	Longitude	Parameters	Freq	Lead Staff
15030202-005B	BOULDER CREEK - blw Butte Cr	Stream	BMP effectiveness	BWBOU006.01	34.614143	-113.220615	Macroinvertebrate, Full chemset, SEM Habitat & SDAM survey	1x, Spring Index period	JL15
15030202-005A	BOULDER CREEK - ABOVE HILLSIDE MINE	Stream	BMP effectiveness	BWBOU008.42	34.638712	-113.207204	Macroinvertebrate, Full chemset, SEM Habitat & SDAM survey	1x, Spring Index period	JL15
15070102-034B	BIG BUG CREEK - BELOW PROVIDENCE MINE	Stream	BMP effectiveness	MGBGB023.15	34.4535	-112.306472	Macroinvertebrate, Full chemset, SEM Habitat & SDAM survey	1x, Spring Index period	JS9
15070102-034A	Big Bug Below Poland Walker	Stream	BMP effectiveness	MGBGB027.21	34.43641	-112.36469	Macroinvertebrate, Full chemset, SEM Habitat & SDAM survey	1x, Spring Index period	JS9
15070102-034A	Big Bug immediately below PWT entry point	Stream	BMP effectiveness	MGBGB			Macroinvertebrate, Full chemset, SEM Habitat & SDAM survey	1x, Spring Index period	JS9
15070103-007A	HASSAYAMPA RIVER - BELOW SENATOR MINE	Stream	BMP effectiveness	MGHSR112.91	34.426139	-112.4335	Macroinvertebrate, Full chemset, SEM Habitat & SDAM survey	1x, Spring Index period	ILC
15070103-007A	HASSAYAMPA RIVER - DOWNSTREAM OF WETLAND MINE	Stream	BMP effectiveness	MGHSR113.86	34.432944	-112.420333	Macroinvertebrate, Full chemset, SEM Habitat & SDAM survey	1x, Spring Index period	ILC
15070102-033A	Lynx Cr at Enchanted Forest Trail	Stream	BMP effectiveness	MGLNX014.17	34.500234	-112.371428	Macroinvertebrate, Full chemset, SEM Habitat & SDAM survey	1x, Spring Index period	ILC
15070102-033A	Lynx Creek - At Gold Pan Way	Stream	BMP effectiveness	MGLNX017.42	34.465927	-112.373124	Macroinvertebrate, Full chemset, SEM Habitat & SDAM survey	1x, Spring Index period	ILC

WBID	WATERBODY_DESC	Group	Type	Site	Latitude	Longitude	Parameters	Freq	Lead Staff
15070102-033A	LYNX CREEK blw Sheldon Wash	Stream	BMP effectiveness	MGLNX018.75	34.452714	-112.386964	Macroinvertebrate, Full chemset, SEM Habitat & SDAM survey	1x, Spring Index period	ILC
15050301-001	Sonoita Creek below 3R Confluence	Stream	BMP effectiveness	SCSON012.97	31.499	-110.816	Macroinvertebrate, Full chemset, SEM Habitat	1x, Spring Index period	JS9
15050301-013C	Sonoita Creek Above 3R Confluence, at Salerno Rd xing	Stream	BMP effectiveness	SCSON015.35	31.5158333	-110.7927778	Macroinvertebrate, Full chemset, SEM Habitat	1x, Spring Index period	JS9
15050301-013C	SONOITA CREEK - Abv Alum Gulch	Stream	BMP effectiveness	SCSON015.51	31.516778	-110.784306	Macroinvertebrate, Full chemset, SEM Habitat	1x, Spring Index period	JS9
15050301-558B	THREE R CANYON - BELOW UPPERMOST SPRING	Stream	BMP effectiveness	SCTHC003.83	31.476744	-110.773321	Macroinvertebrate, Full chemset, SEM Habitat & SDAM survey	1x, Spring Index period	JS9

Table D3. Remote flow monitoring equipment servicing &amp; Streamflow Duration Assessment Method (SDAM) surveys at Hassayampa River reaches – Site List and Schedule

WBID	WATERBODY_DESC	Group	Type	Site	Latitude	Longitude	Parameters	Freq	Lead Staff
AZ15070103-001A	Hassayampa River at Baseline Rd crossing	Stream	Flow duration surveys	TBD	33.378156,	-112.737147	SDAM survey & service flow equipment (if present)	Quarterly for servicing; fall & spring only for SDAMs	PHS
AZ15070103-002A	Hassayampa River downstream of TNC preserve at USGS gage-Morristown	Stream	Flow duration surveys	TBD	33.88522	-112.66026	SDAM survey & service flow equipment (if present)	Quarterly for servicing; fall & spring only for SDAMs	PHS
AZ15070103-002A	Hassayampa River upstream of TNC preserve & downstream of	Stream	Flow duration surveys	TBD	33.970183	-112.725748	SDAM survey & service flow equipment (if present)	Quarterly for servicing;	PHS

106 MI

WBID	WATERBODY_DESC	Group	Type	Site	Latitude	Longitude	Parameters	Freq	Lead Staff
	Hwy93 pedestrian bridge in Wickenburg							fall & spring only for SDAMs	
AZ15070103-002A	Hassayampa River @ TNC/County Park	Stream	Flow duration surveys	MGHSR048.20	33.9379444	-112.6996944	SDAM survey & service flow equipment (if present)	Quarterly for servicing; fall & spring only for SDAMs	PHS
AZ15070103-002B	Hassayampa River @ CAP crossing	Stream	Flow duration surveys	TBD	33.64127,	-112.72414	SDAM survey & service flow equipment (if present)	Quarterly for servicing; fall & spring only for SDAMs	PHS
AZ15070103-003	Hassayampa River in Wickenburg; upstream of Hwy60/93 rotary & Sols Wash confluence	Stream	Flow duration surveys	TBD	33.972526,	-112.726797	SDAM survey & service flow equipment (if present)	Quarterly for servicing; fall & spring only for SDAMs	PHS
AZ15070103-004	Hassayampa River downstream of BLM gage; box cyn dam	Stream	Flow duration surveys	MGHSR058.80	34.0451667	-112.7101111	SDAM survey & service flow equipment (if present)	Quarterly for servicing; fall & spring only for SDAMs	PHS
AZ15070103-007A	Hassayampa River - Senator mine area	Stream	Flow duration surveys	MGHSR112.91	34.426139	-112.4335	SDAM survey & service flow equipment (if present)	Quarterly for servicing; fall & spring only for SDAMs	PHS



106 MI

WBID	WATERBODY_DESC	Group	Type	Site	Latitude	Longitude	Parameters	Freq	Lead Staff
AZ15070103-007A	Hassayampa River below Wetlands mine	Stream	Flow duration surveys	MGHSR113.86	34.432944	-112.420333	SDAM survey & service flow equipment (if present)	Quarterly for servicing; fall & spring only for SDAMs	PHS
AZ15070103-007A	Hassayampa River at headwaters	Stream	Flow duration surveys	MGHSR115.34	34.422778,	112.400833	SDAM survey & service flow equipment (if present)	Quarterly for servicing; fall & spring only for SDAMs	PHS
AZ15070103-007A	Hassayampa River, upstream of Copper Cr & blw Little Copper Cr	Stream	Flow duration surveys	TBD	34.43599,	112.509991	SDAM survey & service flow equipment (if present)	Quarterly for servicing; fall & spring only for SDAMs	PHS

Table D4. Streamflow Duration Assessment Method (SDAM) surveys for flow regime and at “ephemeral breaks” – Only 40 of the following 90 will be selected for FY21. Frequency is 1 for all and no samples taken.

WBID	WATERBODY_DESC	Priority	Type	Category	Impacted water	Rationale	Lead Staff
15050301-xxx	Agua Fria Cyn	High	Digitize waterbody, SDAM survey	Impaired water	Pena Blanca Lake	Pena Blanca Lake lies within/discharges to Agua Fria Canyon (not digitized, FR unknown), trib to SCR intermittent reach with connection to SCR TNW. Could be WOTUS if Agua Fria Cyn has at least intermittent flow to the SCR.	Contractor
15070102-031A	Agua Fria R	High	SDAM survey	Impaired water, EDW	Lynx Cr & permittee	Lynx Cr reach 033A has undetermined FR, and the downstream reach 033B is also undetermined, trib to Agua Fria reach 031A (null),	Contractor

106 MI

						then int/peren reaches to Lake Pleasant, a TNW.	
AZ15070102-001C	Agua Fria River	High	SDAM survey	High # perennial/intermit waters upstream			Contractor
AZ15070102-008	Agua Fria River	Low	SDAM survey	High # perennial/intermit waters upstream			Contractor
15050304-005, 006	Altar Wash	Low	needs flow regime, SDAM survey	Impaired water	ARIVACA LAKE	Lies within Cedar Cr (undetermined), trib to Arivaca Creek (undetermined), trib to Altar Wash (undetermined), trib to SCR intermittent reach (downstream of TNW segment), trib to Gila River. The hydrology is mostly unknown for many reaches and stream miles in lowland desert streams which are likely ephemeral. Chances are low that either Cedar Cr will be intermittent or that all ephemeral reaches will pass the ephemeral break test.	Contractor
15050301-561A	Alum Gulch	High	flow regime, SDAM survey	Impaired water	Alum Gulch	This reach of Alum Gulch is undetermined, connects to perennial Alum G reaches, then connects to undetermined reach of Sonoita Cr abv Patagonia Lake, which then makes an intermittent connection to SCR to the SCR TNW. Possibly WOTUS if this reach is at least intermittent and connecting reach of Sonoita is at least intermittent or passes the ephemeral break test.	Contractor
15050301-561B	ALUM GULCH	High	flow regime, SDAM survey	Impaired water	Alum Gulch	This reach of Alum Gulch is undetermined, connects to perennial Alum G reaches,	Contractor

# 106 MI

						then connects to undetermined reach of Sonoita Cr abv Patagonia Lake, which then makes an intermittent connection to SCR to the SCR TNW. Possibly WOTUS if this reach is at least intermittent and connecting reach of Sonoita is at least intermittent or passes the ephemeral break test.	
15050301-561C	ALUM GULCH	High	flow regime, SDAM survey	Impaired water	Alum Gulch	This reach of Alum Gulch is undetermined, connects to perennial Alum G reaches, then connects to undetermined reach of Sonoita Cr abv Patagonia Lake, which then makes an intermittent connection to SCR to the SCR TNW. Possibly WOTUS if this reach is at least intermittent and connecting reach of Sonoita is at least intermittent or passes the ephemeral break test.	Contractor
AZ15050203-004C	Aravaipa Creek	High	SDAM survey	High # perennial/intermit waters upstream			Contractor
15050304-008	Arivaca Cr	Low	needs flow regime, SDAM survey	Impaired water	ARIVACA LAKE	Lies within Cedar Cr (undetermined), trib to Arivaca Creek (undetermined), trib to Altar Wash (undetermined), trib to SCR intermittent reach (downstream of TNW segment), trib to Gila River. The hydrology is mostly unknown for many reaches and stream miles in lowland desert streams which are likely ephemeral. Chances are	Contractor

106 MI

						low that either Cedar Cr will be intermittent or that all ephemeral reaches will pass the ephemeral break test.	
15050100-1818	Arnett Creek	High	needs flow regime, SDAm surveys on two reaches	Impaired water	ARNETT CREEK	Arnett Creek has undetermined FR (though AGFD has stated it is at least intermittent) and is trib to Queen Cr has null/undetermined FR, there are several undetermined Queen Cr reaches downstream, trib to the EMF (status?), trib to Gila R-ephemeral reach. All these undetermined reaches would have to be identified as at least intermittent, and the ephemeral reach of the Gila would have to pass the ephemeral/typical year test to be WOTUS. Highly unlikely.	Contractor
AZ15030201-006	Big Sandy River	High	SDAM survey	Impaired water	Boulder & burro Cr		Contractor
AZ15030201-007	Big Sandy River	High	SDAM survey	Impaired water	Boulder & burro Cr		Contractor
AZ15030201-009	Big Sandy River	High	SDAM survey	Impaired water	Boulder & burro Cr		Contractor
AZ15030201-012	Big Sandy River	High	SDAM survey	Impaired water	Boulder & burro Cr		Contractor
AZ15030201-094	Big Sandy River	High	SDAM survey	Impaired water	Boulder & burro Cr		Contractor
AZ15030204-327	Bill Williams River	High	SDAM survey	High # perennial/intermit waters upstream			Contractor
15020010-xxx	Black Canyon Cr	High	Needs flow regime, SDAM survey	Impaired water	BLACK CANYON LAKE	Lies within West Fork Black Canyon - no line work in GIS so FR is undetermined. Black Canyon is also undetermined to its confluence with Chevelon Cyn (peren) trib to LCR(peren). If WF Black Cyn is int/peren or passes	Contractor

106 MI

						ephem break test, and Black Cyn flow can be determined as int/peren, then this lake could be WOTUS.	
15070102-035	Black Canyon Cr	High	needs flow regime, SDAM survey	Impaired water	Turkey Creek	This reach is intermittent, but trib to Black Cyn Cr (undetermined), then the AguaFria which is jurisdictional. Could be WOTUS if Black Cyn cr is at least intermittent or passes the ephemeral break test	Contractor
15030202-005A	Boulder Creek	High	SDAM survey	Impaired water	Boulder Cr	Boulder Cr reach is int/peren in this reach; but there are two undetermined Boulder Cr reaches downstream, trib to two undetermined reaches of Burro Cr, then a perennial Burro Cr reach which is trib to int/peren reaches of the Big Sandy R, which has an undetermined reach at the mouth. If the undetermined reaches were identified as int/peren or pass the ephemeral break test, then this reach could be WOTUS.	Contractor
15030202-005B	Boulder Creek	High	SDAM survey	Impaired water	Boulder Cr	Boulder Cr reach is int/peren in this reach; but there are two undetermined Boulder Cr reaches downstream, trib to two undetermined reaches of Burro Cr, then a perennial Burro Cr reach which is trib to int/peren reaches of the Big Sandy R, which has an undetermined reach at the mouth. If the undetermined reaches were identified as int/peren or pass the ephemeral break test, then this reach could be WOTUS.	Contractor

## FY21 Sampling and Analysis Plan for Water Quality

106 MI

15030202-006B	Boulder Creek	High	SDAM survey	Impaired water	Boulder Cr	Boulder Cr reach is int/peren in this reach; but there are two undetermined Boulder Cr reaches downstream, trib to two undetermined reaches of Burro Cr, then a perennial Burro Cr reach which is trib to int/peren reaches of the Big Sandy R, which has an undetermined reach at the mouth. If the undetermined reaches were identified as int/peren or pass the ephemeral break test, then this reach could be WOTUS.	Contractor
AZ15030202-005C	Boulder Creek	High	SDAM survey	Impaired water			Contractor
AZ15030203-027	Bridle Creek	Low	SDAM survey	High # perennial/intermit waters upstream			Contractor
AZ15030202-002	Burro Creek	High	SDAM Survey	OAW	Boulder Cr		Contractor
AZ15030202-004	Burro Creek	High	SDAM Survey	OAW	Boulder Cr		Contractor
15020015-001-I	Canyon Diablo	High	flow regime by remote sensing; on Indian land	Impaired water	LAKE MARY (LOWER & Upper)	Lies within Walnut Cr (Undetermined), trib to San Francisco Wash (null), trib to Padre Cyn (null), trib to Canyon Diablo (undet), trib to the LCR (Int). If these four segments are at least intermittent OR pass the ephemeral break test, then Lake Mary could be WOTUS.	Contractor
15070103-349	CASH MINE CREEK	High	needs flow regime, SDAM survey		CASH MINE CREEK	This reach has unidentified FR, but is trib to Hassayampa reach 007A and several undetermined downstream reaches of the Hasasyampa; if they are identified as at least intermittent or pass the ephemeral break test, then this reach could be WOTUS.	Contractor
15010004-multiple reaches	Cataract Cr	Low	Needs flow regime,	Impaired water	Santa Fe Rservoir	Lies within Cataract Creek "undetermined" reach (could	Contractor

106 MI

			SDAM survey, must pass typical year test			be intermittent by Vegetation) but becomes an ephemeral wash, then EPH reach of Cataract Cr, trib to PER Havasu Cr & Colorado R; this reach would have to be identified as intermittent flow, then pass the ephemeral break/typical year test- Unlikely to pass as WOTUS	
15050304-437	Cedar Creek	Low	needs flow regime, SDAM survey	Impaired water	ARIVACA LAKE	Lies within Cedar Cr (undetermined), trib to Arivaca Creek (undetermined), trib to Altar Wash (undetermined), trib to SCR intermittent reach (downstream of TNW segment), trib to Gila River. The hydrology is mostly unknown for many reaches and stream miles in lowland desert streams which are likely ephemeral. Chances are low that either Cedar Cr will be intermittent or that all ephemeral reaches will pass the ephemeral break test.	Contractor
AZ15020010-002	Chevelon Canyon	Low	SDAM Survey	Impaired water			Contractor
AZ15020010-003	Chevelon Canyon	High	flow regime, SDAM survey	Impaired water	WILLOW SPRINGS LAKE	Lies within Willow Springs Cr (undetermined FR), trib to Chevelon cyn (peren), but there are two reaches of Chevelon downstream that have Undetermined flow that create an ephemeral break. Willow Springs Cr & the two Chevelon reaches would have to be determined as int/peren and/or pass the ephem break test.	Contractor
15050203-022B	COPPER CREEK	High	flow regime, SDAM survey	Impaired water	COPPER CREEK	This reach would be WOTUS if the downstream reach 022B could be determined to be at	Contractor

106 MI

						least intermittent; Copper Cr is trib to reach 003 of San Pedro, an intermittent reach which feeds into reach 001, a perennial reach, which is trib to the Gila R reach 008 a perennial reach which feeds into the Gila R TNW	
15050301-560	Cox gulch	High	needs flow regime, SDAM survey	Impaired water	UNNAMED TRIB TO COX GULCH	Unnamed trib to Cox Gulch has undetermined FR, but is trib to Cox Gulch identified as perennial (?), is trib to Three R cyn undetemrined reach, then connects to undetermined reach of Sonoita Cr abv Patagonia Lake, which then makes an intermittent connection to SCR to the SCR TNW. Possibly WOTUS if this reach is at least intermittent connecting reaches are at least intermittent or ephemeral segments pass the ephemeral break test.	Contractor
AZ15010004-016	Dogtown wash	Low	needs flow regime, SDAM survey	Impaired water	KAIBAB LAKE	Lies within Dogtown wash (undetermined) but likely ephemeral wash, trib to EPH Cataract Cr, trib to PER Havasu Cr & Colorado R. If Dogtown identified as "EPH" then Kaibab Lake would definitely be NON_WOTUS (looks ephem by vegetation in imagery); To be WOTUS Dogtown wash must be intermittent and downstream ephm reaches must pass ephem break/typical year test.	Contractor
15070102-768	Eugene gulch	High	needs flow regime, SDAM survey	Impaired water	EUGENE GULCH	Flow undetermined for this reach; trib to BigBug reach 034A (intermit), then int/peren reaches of Agua	Contractor



106 MI

						Fria to Lake Pleasant TNW. Could be WOTUS if this reach is determined to be at least intermittent.	
15060103-887	GIBSON MINE TRIBUTARY	High	needs flow regime, SDAM survey	Impaired water	GIBSON MINE TRIBUTARY	GMT has undetermined FR, trib to Pinto Cr (intermit), trib to Roosevelt Lake, TNW. Could be WOTUS if GMT is at least intermittent.	Contractor
AZ15070201-014 & multiple reaches	Gila R	Low	typical year analysis	Impaired water	PAINTED ROCK LAKE	If the entire Gila River is identified as TNW, this lake could be a WOTUS. However, its currently on an "undetermined" reach of the Gila with multiple unidentified reaches & a large ephemeral break downstream; its reach would have to be identified as at least intermittent, and the ephemeral break pass the typical year test to be WOTUS.	Contractor
AZ15060202-058, 059B, 059C	Granite Creek	Very High	needs flow regime, SDAM survey	Impaired water	14impaired water lists: Aspen Cr, BanningCr, Butte Cr, Government Cyn, Granite Cr, Manzanita Cr, Miller Cr, North Fork Miller Cr, North granite Cr, Slaughterhouse gulch, two unnamed tribs, Watson Lake, Willow Cr Reservoir	Granite Cr undetermined reaches of Granite Cr upstream of Watson Lake, but there are several downstream reaches that are undetermined FR, and is trib to perennial Verde R, which is perennial/int downstream to the Salt River but an undetermined segment blw Granite Reef Dam and ephemeral reach 001C downstream before reaching the intermittent/perennial and TNW reaches of the Gila. Could be WOTUS if Salt R determined to be TNW by COE or if ephem breaks pass typical year test and if Banning Cr flow formally	Contractor

106 MI

						identified as Int/perenn. Also FR on Banning & Granite Creek segments need to be identified.	
AZ15050301-025B	Harshaw creek	High	typical year analysis	Impaired water	UNNAMED TRIB (ENDLESS MINE TRIBUTARY) TO HARSHAW CREEK	This trib has undetermined FR, and is trib to ephemeral Harshaw Cr, trib to an intermittent, then undetermined reach of Sonoita Creek, but with connections to the SCR TNW downstream. Unlikely that this is intermittent and the ephemeral reach of Harshaw Cr passes the ephemeral break test..	Contractor
15070103-001A, 002B, 003	Hassayampa R	High	needs flow regime, SDAM survey	Impaired water	CASH MINE CREEK, French Gulch	This reach has unidentified FR, but is trib to Hassayampa reach 007A and several undetermined downstream reaches of the Hassayampa; if they are identified as at least intermittent or pass the ephemeral break test, then this reach could be WOTUS.	Contractor
15070102-xxx	Horsethief Creek	High	needs linework, flow regime, SDAM	Impaired water	HORSETHIEF LAKE	Lake is on Horsethief Cyn (unknown FR, no line on NHD med-Res), trib to Poland Cr (undet FR), trib to Black Cyn Cr (undeterm), trib to AFR a jurisdictional water. Longshot, but Could be wotus if undetermined reaches are identified as at least intermittent, and any ephemeral breaks pass the typical year test.	Contractor
AZ15050203-013	Hot Springs Canyon	Low	SDAM Survey	High # perennial/intermit waters upstream			Contractor
15050301-340	HUMBOLDT CANYON	High	flow regime, SDAM survey	Impaired water	HUMBOLDT CANYON	Humboldt Cyn has undetermined FR, trib to Alum Gulch (perennial), trib	Contractor

106 MI

						to undetermined reach of Sonoita Cr abv Patagonia Lake, which then makes an intermittent connection to SCR to the SCR TNW. Possibly WOTUS if Humboldt is at least intermittent flow regime, and connecting reach of Sonoita is at least intermittent or passes the ephemeral break test.	
15070102-033A	Lynx Creek	High	SDAM survey	Impaired water	Lynx Cr	Lynx Cr reach 033A has undetermined FR, and the downstream reach 033B is also undetermined, trib to Agua Fria reach 031A (null), then int/peren reaches to Lake Pleasant, a TNW.	Contractor
15070102-033B	Lynx Creek	High	SDAM survey	Impaired water	Lynx Cr	Lynx Cr reach 033A has undetermined FR, and the downstream reach 033B is also undetermined, trib to Agua Fria reach 031A (null), then int/peren reaches to Lake Pleasant, a TNW.	Contractor
15050100-012D, 012C	Mineral Cr	High	Typical year analysis on ephemeral segment 012C, needs flow regime, SDAM survey on 012D	Impaired water	Mineral Creek	This reach is peren, but theres an EPH break just downstream, and an undetermined reach at the mouth. If there is flow across the ephem break in a typical year, and the undetermined reach had known FR, then the reach could be WOTUS.	Contractor
15070102-123	MONEY METALS TRIB	High	flow regime, SDAM survey	Impaired water	MONEY METALS TRIB	Money metals trib currently has undetermined FR; if identified as ephem, it will be NON_WOTUS. If flow in downstream "trib to BigBugCr" passes ephem break/typical year test AND reach 034A of Big Bug Cr is determined to be at least	Contractor

106 MI

						intermittent or pass the ephem break test, then flow connections will be made to downstream intermittent reaches of Big Bug Cr and int/peren reaches of the Agua Fria R to Lake Pleasant, a TNW. Longshot but could Be WOTUS.	
15050301-011	NOGALES WASH	High	needs flow regime, SDAM survey	Impaired water	NOGALES WASH	Nogales wash has undetermined FR, trib to Portrero Cr (undetermined), trib to Santa Cruz (intermitt) with connection to SCR TNW downstream. Possibly WOTUS if Nogales Wash is at least intermittent, Portrero is at least intermittent or passes the ephemeral break test.	Contractor
15020015-0061	Padre Canyon	High	flow regime by remote sensing; on Indian land	Impaired water	LAKE MARY (LOWER & Upper)	Lies within Walnut Cr (Undetermined), trib to San Francisco Wash (null), trib to Padre Cyn (null), trib to Canyon Diablo (undet), trib to the LCR (Int). If these four segments are at least intermittent OR pass the ephemeral break test, then Lake Mary could be WOTUS.	Contractor
15070201-1010	PAINTED ROCK LAKE		Flow regime of lake identified	Impaired water	PAINTED ROCK LAKE	If the entire Gila River is identified as TNW, this lake could be a WOTUS. However, its currently on an "undetermined" reach of the Gila with multiple unidentified reaches & a large ephemeral break downstream; its reach would have to be identified as at least intermittent, and the ephemeral break pass the	Contractor

106 MI

						typical year test to be WOTUS.	
15050301-234B	Parker cyn Cr	High	needs flow regime, SDAm surveys on two reaches	Impaired water	Parker Canyon Lake	Parker Cyn Lake lies within Parker Cyn Cr (undetermined FR), trib to upper Santa Cruz R in Mexico (assumed intermittent), then peren/int reaches of SCR to TNW reach. Could be WOTUS if two reaches of Parker Cyn Cr are at least intermittent.	Contractor
15050301-475	Peck Cr cyn	High	needs flow regime, SDAm surveys on two reaches	Impaired water	PECK CANYON CREEK	Peck Cyn Cr has undetermined FR, trib to SCR (intermittent) with connection to SCR TNW. WOTUS if Peck Cyn Cr has at least intermittent flow.	Contractor
15060202-1060	Pecks lake	High	Connection to Verde River to be identified	Impaired water	PECK'S LAKE	Pecks Lake is an oxbow of the Verde River, and there is still a surface water connection at the downstream end, however its unclear whether the lake is "inundated by flooding in a typical year" sufficient to make the connection to the Verde River. In addition to meeting the inundation test, the Verde River must be found to be WOTUS for this lake to be identified as WOTUS. Additional investigation is need to de4termine if Pecks Lake would be inundated in a typical year, based on its geography.	Contractor
15050301-500A	Potrero Cr	High	needs flow regime, SDAm surveys on two reaches	Impaired water	NOGALES WASH	Nogales wash has undetermined FR, trib to Portrero Cr (undetermined), tribt to Santa Cruz (intermitt) with connection to SCR TNW downstream. Possibly WOTUS if Nogales Wash is	Contractor

# 106 MI

						at least intermittent, Portrero is at least intermittent or passes the ephemeral break test.	
15050100-014A	Queen Cr	High	needs flow regime, SDAm surveys on two reaches	Impaired water	QUEEN CREEK	This reach of Queen Cr has null/undetermined FR, there are several undetermined Queen Cr reaches downstream, trib to the EMF (status?), trib to Gila R-ephemeral reach. All these undetermined reaches would have to be identified as at least intermittent, and the ephemeral reach of the Gila would have to pass the ephemeral/typical year test to be WOTUS. Highly unlikely.	Contractor
15050100-014B	Queen Cr	High	needs flow regime, SDAm surveys on two reaches	Impaired water	QUEEN CREEK	This reach of Queen Cr has null/undetermined FR, there are several undetermined Queen Cr reaches downstream, trib to the EMF (status?), trib to Gila R-ephemeral reach. All these undetermined reaches would have to be identified as at least intermittent, and the ephemeral reach of the Gila would have to pass the ephemeral/typical year test to be WOTUS. Highly unlikely.	Contractor
15050100-014C	Queen Cr	High	needs flow regime, SDAm surveys on two reaches	Impaired water	QUEEN CREEK	This reach of Queen Cr has null/undetermined FR, there are several undetermined Queen Cr reaches downstream, trib to the EMF (status?), trib to Gila R-ephemeral reach. All these undetermined reaches would have to be identified as at least intermittent, and the ephemeral reach of the Gila	Contractor

106 MI

						would have to pass the ephemeral/typical year test to be WOTUS. Highly unlikely.	
Z15060105-014	Rye Cr	High	Apply camera data to reach; flow regime, SDAM on Rye Cr	Impaired water	BARNHARDT CREEK	Barnhardt Cr has undetermined FR (game camera data should prove intermittent), trib to undetermined Rye Cr, trib to perennial Tonto Cr, trib to Roosevelt Lake, TNW. Could be WOTUS if Barnhardt has confirmed Intermittent flow, and Rye Cr has either intermittent flow or passes ephemeral break test.	Contractor
AZ15060106B-001A	Salt River	High	SDAM Survey	High # perennial/intermit waters upstream	Verde River		Contractor
AZ15060106B-001C	Salt River	High	SDAM Survey	High # perennial/intermit waters upstream	Oak Creek		Contractor
AZ15060106B-002	Salt River	High	SDAM Survey	High # perennial/intermit waters upstream			Contractor
AZ15060106B-002B	Salt River	High	SDAM Survey	High # perennial/intermit waters upstream	BARTLETT LAKE		Contractor
AZ15060106B-003A	Salt River	High	SDAM Survey	High # perennial/intermit waters upstream	APACHE LAKE		Contractor
AZ15060106B-003B	Salt River	High	SDAM Survey	High # perennial/intermit waters upstream	CANYON LAKE		Contractor
AZ15060106B-003C	Salt River	High	SDAM Survey	High # perennial/intermit waters upstream	SPRING CREEK (SPN)		Contractor
AZ15060106B-003D	Salt River	High	SDAM Survey	High # perennial/intermit waters upstream			Contractor
15020015-003	San Francisco Wash	High	flow regime, SDAM survey	Impaired water	LAKE MARY (LOWER & Upper)	Lies within Walnut Cr (Undetermined), trib to San Francisco Wash (null), trib to Padre Cyn (null), trib to	Contractor

106 MI

						Canyon Diablo (undet), trib to the LCR (Int). If these four segments are at least intermittent OR pass the ephemeral break test, then Lake Mary could be WOTUS.	
15050202-001, 15050203-012, 008	San Pedro River	High	typical year analysis	Impaired water	CURRY DRAW, Greenbush draw	Curry Draw has undetermined FR, and Greenbush Draw has undetermined FR, and is trib to reach 008 of San Pedro, a perennial reach, but there are three San Pedro ephemeral reaches downstream, which would have to pass the ephemeral break/typical year test for this reach to be WOTUS.	Contractor
AZ15030203-013	Santa Maria River	High	SDAM Survey	High # perennial/intermit waters upstream			Contractor
AZ15030203-014	Santa Maria River	High	SDAM Survey	High # perennial/intermit waters upstream			Contractor
15020005-010	Show Low Cr	High	flow regime, SDAM survey	Impaired water	SCOTT RESERVOIR	Lies within Porter Cr (peren), trib to Show Low Cr (peren) but has a "null" reach #010 at confluence with Silver Cr; if this segment is int/peren or ephem & passes Ephem Break test, this lake could be WOTUS	Contractor
15050301-013C	Sonoita cr	High	flow regime, SDAM survey	Impaired water	HUMBOLDT CANYON. Alum Gulch, UA2	Humboldt Cyn has undetermined FR, trib to Alum Gulch (perennial), trib to undetermined reach of Sonoita Cr abv Patagonia Lake, which then makes an intermittent connection to SCR to the SCR TNW. Possibly WOTUS if Humboldt is at least intermittent flow regime, and connecting reach of Sonoita is	Contractor



106 MI

						at least intermittent or passes the ephemeral break test.	
AZ15060202-027	Sycamore Creek	Low	SDAM Survey	High # perennial/intermit waters upstream			Contractor
AZ15060202-028B	Sycamore Creek	Low	SDAM Survey	High # perennial/intermit waters upstream			Contractor
AZ15040004-059A	Thomas Creek	Low	SDAM Survey	High # perennial/intermit waters upstream			Contractor
15050301-558C	Three R Cyn	High	needs flow regime, SDAM survey	Impaired water	UNNAMED TRIB TO COX GULCH	Unnamed trib to Cox Gulch has undetermined FR, but is trib to Cox Gulch identified as perennial (?), is trib to Three R cyn undetermined reach, then connects to undetermined reach of Sonoita Cr abv Patagonia Lake, which then makes an intermittent connection to SCR to the SCR TNW. Possibly WOTUS if this reach is at least intermittent connecting reaches are at least intermittent or ephemeral segments pass the ephemeral break test.	Contractor
15050301-558B	Three R, Sonoita	High	flow regime, SDAM survey	Impaired water	THREE R CANYON	This reach of Three R Cyn has undetermined/null FR, as well as another undetermined reach downstream, connects to undetermined reach of Sonoita Cr abv Patagonia Lake, which then makes an intermittent connection to SCR to the SCR TNW. Possibly WOTUS if this reach and connecting reaches are at least intermittent or ephemeral segments pass the ephemeral break test.	Contractor

106 MI

15050301-558C	Three R, Sonoita	High	flow regime, SDAM survey	Impaired water	THREE R CANYON	This reach of Three R Cyn has undetermined/null FR, connects to undetermined reach of Sonoita Cr abv Patagonia Lake, which then makes an intermittent connection to SCR to the SCR TNW. Possibly WOTUS if this reach and connecting reaches are at least intermittent or ephemeral segments pass the ephemeral break test.	Contractor
15070102-234	trib to Big Bug Cr, Big Bug Cr	High	flow regime, SDAM survey	Impaired water	MONEY METALS TRIB	Money metals trib currently has undetermined FR; if identified as ephem, it will be NON_WOTUS. If flow in downstream "trib to BigBugCr" passes ephem break/typical year test AND reach 034A of Big Bug Cr is determined to be at least intermittent or pass the ephem break test, then flow connections will be made to downstream intermittent reaches of Big Bug Cr and int/peren reaches of the Agua Fria R to Lake Pleasant, a TNW. Longshot but could Be WOTUS.	Contractor
AZ15060202-033	Tule Tank Wash	Low	SDAM Survey	High # perennial/intermit waters upstream			Contractor
15050301-888	UNNAMED TRIB (ENDLESS MINE TRIBUTARY) TO HARSHAW CREEK		needs flow regime, SDAM survey	Impaired water	UNNAMED TRIB (ENDLESS MINE TRIBUTARY) TO HARSHAW CREEK	This trib has undetermined FR, and is trib to ephemeral Harshaw Cr, trib to an intermittent, then undetemrined reach of Sonoita Creek, but with connections to the SCR TNW downstream. Unlikely that this is intermittent and the	Contractor

106 MI

						ephemeral reach of Harshaw Cr passes the ephemeral break test..	
15050301-641	UNNAMED TRIB (UA2) TO ALUM GULCH	High	flow regime, SDAM survey	Impaired water	UNNAMED TRIB (UA2) TO ALUM GULCH	This unnamed trib has undetermined FR, is trib to perennial reach of Alum Gulch, connects to undetermined reach of Sonoita Cr abv Patagonia Lake, which then makes an intermittent connection to SCR to the SCR TNW. Possibly WOTUS is this reach is at least intermittent and connecting reach of Sonoita is at least intermittent or passes the ephemeral break test.	Contractor
15070102-1994	Unnamed trib to Eugene gulch	High	needs flow regime, SDAM survey	Impaired water	UNNAMED TRIB TO EUGENE GULCH	Flow is null for this reach; trib to Eugene Gulch (undetermined), BigBug reach 034A (intermit), then int/peren reaches of Agua Fria to Lake Pleasant TNW. Could be WOTUS if this reach is determined to be at least intermittent and flow in Eugene gulch is at least intermittent or passes the ephemeral break test.	Contractor
15020005-238	Walnut Cr	High	flow regime, SDAM survey	Impaired water	RAINBOW LAKE	Lies within Walnut Cr (Undetermined), trib to Show Low Cr (peren) but has a "null" reach #010 at confluence with Silver Cr; if these two segments are int/peren or ephem & pass Ephem Break test, this lake could be WOTUS	Contractor
15020015-199 & other reaches	Walnut Cr	High	flow regime, SDAM survey	Impaired water	LAKE MARY (LOWER & Upper)	Lies within Walnut Cr (Undetermined), trib to San Francisco Wash (null), trib to Padre Cyn (null), trib to	Contractor

106 MI

						Canyon Diablo (undet), trib to the LCR (Int). If these four segments are at least intermittent OR pass the ephemeral break test, then Lake Mary could be WOTUS.	
15020010-xxx	West Fork Black Canyon	High	Digitize waterbody, SDAM survey	Impaired water	BLACK CANYON LAKE	Lies within West Fork Black Canyon - no line work in GIS so FR is undetermined. Black Canyon is also undetermined to its confluence with Chevelon Cyn (peren) trib to LCR(peren). If WF Black Cyn is int/peren or passes ephem break test, and Black Cyn flow can be determined as int/peren, then this lake could be WOTUS.	Contractor
AZ15060202-004	Wet Beaver Creek	High	SDAM Survey	High # perennial/intermit waters upstream			Contractor
15020010-240	Willow Springs Cr	High	flow regime, SDAM survey	Impaired water	WILLOW SPRINGS LAKE	Lies within Willow Springs Cr (undetermined FR), trib to Chevelon cyn (peren), but there are two reaches of Chevelon downstream that have Undetermined flow that create an ephemeral break. Willow Springs Cr & the two Chevelon reaches would have to be determined as int/peren and/or pass the ephem break test.	Contractor